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DOCTORAL THESIS

Climate change adaptation planning in Cambodia and potential for improvements.

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Climate Change Adaptation Planning in Cambodia and Potential for Improvements

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**Submitted in total fulfilment of the requirements of
the Degree of Doctor of Philosophy**

June, 2015

Abstract

Human-induced climate change has resulted in increasing vulnerability, especially in least developed countries where adaptive capacity is very low. Climate-informed development planning and decision-making may be able to mitigate climate vulnerability more effectively than current development plans and strategies. Given the cross-cutting nature of climate change adaptation, planning for climate change requires participation from a wide range of stakeholders at multiple levels. Also, because planning for climate change involves making decisions with a high degree of uncertainty, the participation of research communities is crucial. Therefore, institutional arrangements and mechanisms and governance processes play a critical role in climate-informed development planning. The lack of local expertise in least developed countries like Cambodia makes such planning even harder.

This research explores how Cambodia may develop climate-informed development planning given the limited availability of local climate-related scientific information and scientific entities. It also examines the underlying barriers and challenges to such planning for Cambodian ministries and institutions. This study focuses mainly on the water resources and agriculture sectors, as sectors in Cambodia that are highly vulnerable to climate change. Institutional ethnography and case study research methods were employed. The study identifies a number of governance and institutional-related issues that must be addressed in order to effectively facilitate climate-informed development planning in Cambodia. It also identifies pathways for mainstreaming climate change into development policies at the national and subnational levels. Finally, the study identifies some mechanisms for narrowing the research–policy development gaps in Cambodia.

This research concludes that although institutional capacity, including scientific capacity, is very weak in least developed countries like Cambodia, climate-informed development planning still can be undertaken, at least for addressing present climate vulnerabilities. An integration of climate change concerns into either national or subnational development decision-making and planning processes could be done

effectively when appropriate pathways are identified. The study finally proposes a framework for climate-informed development planning for application in Cambodia which may be also applicable in other least developed countries.

Declaration

I, Ms Va Dany, declare that this thesis is my own original work and contains no material which has been previously submitted for a degree or diploma at this University or any other institution. This thesis is submitted to Bond University in fulfilment of the requirements of the degree of Doctor of Philosophy.

Acknowledgements

The process of getting a PhD is a long one, and no PhD student ever does it on their own. My own journey was motivated by a desire to address the impacts of climate change that I could see in Cambodia, the country in which I was born and raised. I would not have been able to finish it without the help of many people and institutions, who I would like to acknowledge here.

I would like to express my sincere gratitude to Associate Professor Bhishna Bajracharya (Bond University), Professor Michael Regan (Bond University), and Professor Pak Sum Low (Bond University and former UKM-Yayasan Sime Darby Chair in Climate Change, Universiti Kebangsaan Malaysia (UKM)) for their feedback, advice and guidance throughout this PhD process. Furthermore, their kind support and encouragement is greatly appreciated. My special thanks go to Professor Ros Taplin (University of New South Wales, and formerly Bond University) and Professor Louis Lebel (Chiang Mai University) for their technical inputs. I would also like to thank Ms Belinda Glynn for her professional editing of this report and the relevant publications. I would like to thank all the research respondents for making themselves available for interview(s) and kindly sharing their experiences, thoughts and information.

This study was made possible by the funding support mainly from the United Board Fellowship Program. My sincere gratitude goes to Dr Luise Arhen and the Royal University of Phnom Penh for their coordination. I would like to dedicate this work to Dr Anne Ofstedal, the former regional director of the United Board Fellowship Program who passed away a few years ago. This study was also partially supported by the Collaborative Centre for Healthy Work and Environment of the University of Washington.

Last but not least, I would like to thank my family and friends for their love, care and support.

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List of Abbreviations

ADB	Asian Development Bank
ASEAN	Association for Southeast Asian Nations
CCA	Climate Change Adaptation
CCD	Department of Climate Change
CCSP	Climate Change Strategic Plan
CCTT	Climate Change Technical Team
CIP	Commune Investment Plan
CM	Council of Ministers
DOP	Department of Planning
DPAM	District Priority Action Matrix
DP	Development Partner
GDOP	General Directorate of Planning
IP3	Three-Year Implementation Plan
IPCC	Intergovernmental Panel on Climate Change
LGCC	Local Government and Climate Change
MAFF	Ministry of Agriculture, Forestry and Fishery
MOE	Ministry of Environment
MOI	Ministry of Interior
MOP	Ministry of Planning
MOWRAM	Ministry of Water Resources and Meteorology
NAPA	National Adaptation Program of Action for Climate Change
NAPA-FU	National Adaptation Program of Action for Climate Change – Follow Up
NCCC	National Climate Change Committee
NGO	Non–Governmental Organisation
NSDP	National Strategic Development Plan
PDAFF	Provincial Department of Agriculture, Forestry and Fishery
PDWRAM	Provincial Department of Water Resources and Meteorology
RUA	Royal University of Agriculture
SAW	Strategy for Agriculture and Water

TWG	Technical Working Group
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
UNFCCC	United Nations Framework Convention on Climate Change
VRA	Vulnerability Reduction Assessment
WB	World Bank

Relevant Publications by the Author

- Dany, V.**, Bajracharya, B., Lebel, L., Regan, M., & Taplin, R. (2015). Narrowing Gaps between Research and Policy Development in Climate Change Adaptation Work in the Water Resources and Agriculture Sectors of Cambodia. *Climate Policy*, 1-16. doi: 10.1080/14693062.2014.1003523
- Bowen, K. J., Miller, F. P., **Dany, V.**, & Graham, S. (2015). The Relevance of a Coproductive Capacity Framework to Climate Change Adaptation: Investigating the Health and Water Sectors in Cambodia. *Ecology and Society*, 20(1). doi: 10.5751/ES-06864-200113
- Dany, V.**, Bowen, J. K., & Miller, F. (2014). Assessing the Institutional Capacity to Adapt to Climate Change: A Case Study in the Cambodian Health and Water Sectors. *Climate Policy*. doi: 10.1080/14693062.2014.937385.
- Käkönen, M., Lebel, L., Karhunmaa, K., **Dany, V.**, & Try, T. (2014). Rendering Climate Change Governable in the Least Developed Countries: Policy Narratives and Expert Technologies in Cambodia. *Forum for Development Studies*, 41(3), 351-376. doi: 10.1080/08039410.2014.962599
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- Bowen, K. J., Miller, F., **Dany, V.**, McMichael, A. J., & Friel, S. (2013). Enabling Environments? Insights into the Policy Context for Climate Change and Health Adaptation Decision-Making in Cambodia. *Climate and Development*, 5(4), 277-287. doi: 10.1080/17565529.2013.833077
- Dany, V.**, Regan, M., Taplin, R., & Bajracharya, B. (2013). The Role of Social Capital and Local Institutions in Coping with Climate Stresses: The Case of Krapum Chhouk Commune in Rural Cambodia. *Asian Journal of Agriculture and Development*, 1(10), 61-78.

Thesis Structure

The overall goal of this research is to explore the possibilities for Cambodia to develop climate-informed development planning and policy. Water resources management and agriculture are the two sectors chosen as cases for this study. This thesis contains four main research objectives and each one of them is developed as a stand-alone chapter (chapter 2 to 5) which contains the related concepts, data collection and analysis, results, discussion and conclusion. This thesis contains six chapters in total, with Chapter 1 as an introduction and Chapter 6 as a conclusion. Due to this design, there are certain repetitions from chapter to chapter.

As an introductory section, Chapter 1 provides a rationale (statements of problem) and a broad conceptual framework for the study, followed by the research objectives and an overview of the study design. Specific details of conceptual frameworks relating to each component are presented in their respective chapters. To minimise repetition, the information about the research methods for the whole research project is given in Chapter 1 (Section 1.6). However, sections about the methods for the stand-alone components were also included in their respective chapters to complement the general information provided in Section 1.6. It mainly covered data analysis and additional information on specific approaches or adjustments if any, in relation to data collection for that specific study component.

Chapter 2 examines the challenges and opportunities for practising climate-informed development planning in Cambodia, focusing on the potential for improvements in Cambodian climate change adaptation (CCA) governance and institutions, thus facilitating more climate-informed development planning. This chapter was submitted for a Handbook on Climate Change Scenarios in Developing Nations and it is under production by the Springer Publisher.

Chapter 3 assesses the mainstreaming of climate change into Cambodia's national development planning and examines pathways for effective mainstreaming. An analysis of Cambodia's national planning processes, stakeholders' engagement and decision-making powers was undertaken in order to examine the pathways for effective mainstreaming. The chapter was submitted to the International Journal of Environment, Development and Sustainability and it is under revision stage.

Chapter 4 demonstrates examples from the case study projects on local planning for climate change using community knowledge with a focus on information generation and integration processes. Part of this chapter was submitted to the International Journal on Climate and Development.

Chapter 5 discusses the institutional mechanisms/applications and communication strategies for narrowing research and policy development and thus enabling and promoting (climate) evidence-based planning for Cambodia. This chapter was published by the International Journal of Climate Policy with minor changes (doi: 10.1080/14693062.2014.1003523).

The concluding chapter, Chapter 6, firstly summarises the key findings from the research in relation to the research objectives and goal. It then discusses and consolidates the study's conceptual framework, designing it as a guiding framework for integrating climate change concerns into development policy and planning. This chapter ends by highlighting the key contributions of this research to the body of knowledge and suggesting areas for further studies. Given that each of the research objectives (Chapters 2 to 5) were designed as stand-alone components wherein specific conclusions and recommendations were included, in an attempt to minimise repetition, Chapter 6 is brief.

1. Introduction

1.1 Rationale

With its poor socioeconomic conditions, technologies and infrastructure, Cambodia has been characterised as having the lowest climate change adaptive capacity of all of the South-East Asian countries (Yusuf & Francisco, 2009). The United Nations considers Cambodia a least developed country, with a low Human Development Index of 0.584, ranking 136 out of the 187 member countries in the 2014 United Nations Human Development Report (UNDP, 2014). Cambodia has a population of approximately 13.4 million people, 80.5 per cent of whom live in rural areas (Royal Government of Cambodia, 2008a). In 2009, nearly 23 per cent of the population was reported to be living below the poverty line, with a high concentration of people living very near the poverty line (Royal Government of Cambodia, 2013e).

Cambodia is located in a tropical region (Figure 1.1) and is dominated by monsoon weather pattern with two seasons: a rainy season from May to October and a dry season from November to April. Annual average rainfalls vary from about 1400 millimetres in lowland areas to about 4000 millimetres in coastal areas, while the annual average temperature is about 28 degrees Celsius, varying from 17 degrees Celsius in January to 38 degrees Celsius in April (Thoeun, 2015). An analysis of historical trends of local temperature in Cambodia suggests an increasing decadal rate of around 0.18 degrees Celsius since 1960, with a project rise from 0.7 to 2.7 degrees Celsius by 2060 and a 1.4 to 4.3 degree Celsius increase by 2090 (McSweeney, New, & Lizcano, 2008). Precipitation is projected to increase by the second half of this century, especially in wetter months (McSweeney et al., 2008; TKK & SEA START RC, 2009). Confirming this, local Cambodian people have also observed changes in climatic conditions. For instance, there have been delays in rainfall onset and more frequent and intensive severe weather impacts such as floods and droughts (BBC World Service Trust's Research and Learning Group, 2011; Geres Cambodia, 2009).

The changing climatic conditions impact local livelihoods, especially agriculture practices which are highly rainfall dependent. For example, many local rice varieties are planted at the beginning of the rainy season and take almost the whole season to reach the harvest stage, thus a delay in rainfall onset negatively affects their productivity. Also, recent records have demonstrated that Cambodia is increasingly vulnerable to climate change, especially with changes in climate extremes, such as record floods, droughts and storms occurring (Royal Government of Cambodia, 2008d). In 2009, Typhoon Ketsana hit 14 Cambodian provinces, causing total losses and damages of US\$ 132 million, with 43 per cent of the loss from agriculture (Royal Government of Cambodia, 2010a). Similarly, in 2002 drought affected 420 communes in 76 districts in 10 of Cambodia's 25 provinces, with total damages estimated to be about US\$ 21.5 million and with 62,702 hectares of the total agriculture area affected (Royal Government of Cambodia, 2008d).

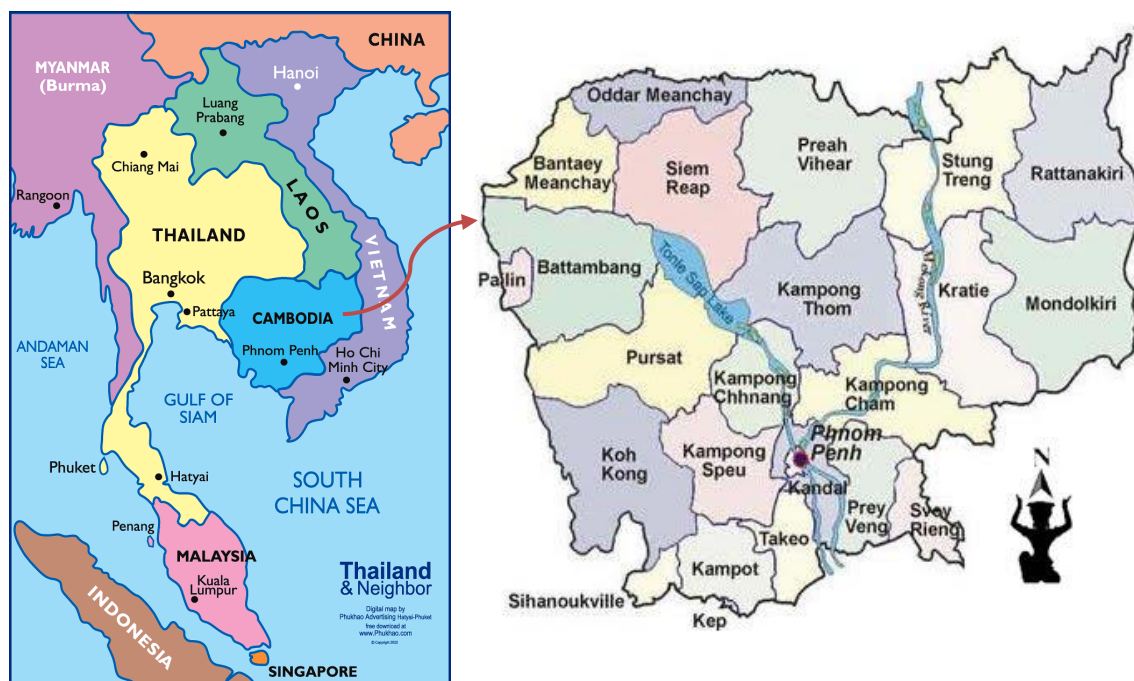


Figure 1.1 Map of Cambodia

Sources: <http://pixgood.com/indochina-peninsula-on-world-map.html> (Map on the left side) and <http://tourismcam.blogspot.com.au/2010/09/province-guide-in-cambodia.html> (Map on the right side). Retrieved on December 16, 2014

Looking at the impacts of projected climate change, water and agriculture are predicted to be the most vulnerable sectors in Asia (Cruz et al., 2007). In particular for the South-East Asian region, a projection study for 2030 suggests that rice, an important source of nutrition for Cambodia, will require adaptation investments due to changing temperatures and rainfalls (Lobell et al., 2008). Based on the Royal Government of Cambodia's report *Vulnerability and Adaptation Assessment to Climate Change in Cambodia*, published in 2001, agriculture in Cambodia has suffered significantly from climate change and extremes; for instance, between 1996 and 2001, floods caused up to about 70 per cent of the total rice production losses in the country (Royal Government of Cambodia, 2001). According to the Cambodian Socio-Economic Survey of 2007, in that year 78 per cent of rural employees worked in the agriculture sector, which comprises crop production, livestock, farming and fishing (Royal Government of Cambodia, 2008c), all highly climate-sensitive livelihoods. With the probability of greater climate change impacts in the future, there is an urgent need for Cambodia to develop strategies and plans for climate change that are responsive to present and future climate vulnerabilities (Royal Government of Cambodia, 2011a).

As part of global efforts to address climate change, some adaptation initiatives have been launched in Cambodia. Many adaptation initiatives in Cambodia have been directed at assisting the development of national policy frameworks. For instance, the First National Communication to the United Nations Framework Convention on Climate Change (UNFCCC) was produced in 2002 (Royal Government of Cambodia, 2002) and the National Adaptation Program of Action for Climate Change (NAPA) for Cambodia was completed in 2006 (Royal Government of Cambodia, 2006b). More recently, Cambodia has developed its National Climate Change Strategic Plan (CCSP) and ministry CCSPs for nine line ministries including the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of Water Resources and Meteorology (MOWRAM). The overall goal of these climate change strategies is to facilitate climate resilience development in Cambodia through mainstreaming climate change into development policies and informing overseas development assistance in Cambodia (Am, Cuccillato, Nkem, & Chevillard, 2013; Royal Government of Cambodia, 2013a).

The major adaptation funding directed to Cambodia includes multilateral funding from the Climate Change Pilot Program for Climate Resilience (PPCR), operated by the World Bank (WB) and the Asian Development Bank (ADB), and the Cambodian Climate Change Trust Fund, operated by the Cambodia's Climate Change Alliance and based at the Department of Climate Change (CCD) of the Ministry of Environment (MOE). The Cambodian Climate Change Trust Fund is a multi-donor funding facility with the first phase's (2010 to 2013) funding amounting to approximately US\$ 9 million, coming from the European Union, Swedish International Development Cooperation Agency, Danish International Development Agency and the United Nations Development Program (UNDP).

Additionally, Cambodia also participates in a number of regional adaptation commitments that aim to address regional and transboundary environmental changes. Table 1.1 summarises some key regional climate change initiatives, especially those of the Mekong River Commission, Association for Southeast Asian Nations (ASEAN) and the ADB. The regional initiatives are crucial for all nations in the region because some environmental issues such as climate change are global problems where solutions need to be implemented at all levels: international, regional and local.

In summary, adaptation initiatives in Cambodia have only recently been developed and most of them have been stand-alone and project-based, which can be incompatible with the sustainable development of the country. At the community level, many Cambodian villagers have practised negative adaptation or maladaptation such as selling valued assets like cattle and boats, receiving immediate credit and migrating to find jobs elsewhere (Royal Government of Cambodia, 2005; TKK & SEA START RC, 2009). These actions may contribute to weakening their home village's future resilience capacity. It is therefore important to ensure that development planning and decision-making in Cambodia is climate informed. Climate-informed policy development occurs when development policies and plans are informed by relevant climate information or evidence, so that climate change concerns are integrated in the policies and plans.

Table 1.1 Selected regional climate change activities in South-East Asia

Initiatives (aims and focuses)	Organisation(s)	Reference(s)
Climate change adaptation initiative (knowledge-sharing, capacity-building, demonstration projects and mainstreaming climate change)	Mekong River Commission	(Mekong River Commission, 2011)
ASEAN cooperation on climate change (Knowledge sharing, capacity building, promote low carbon economics development in the region, foster regional cooperation to address climate change.)	ASEAN Cooperation on Environment	(ASEAN-Working Group on Climate Change, n.d)
Addressing Climate Change in the Asia and Pacific Region Climate Change Adaptation Program for the Pacific Promoting Climate Change Adaptation in Asia and the Pacific Regional partnerships for climate change adaptation and disaster preparedness	ADB	(Asian Development Bank, 2015)
Water, climate and development program for South-East Asia (Awareness and capacity building, knowledge sharing, demonstration projects, research to policy, fostering regional and transboundary collaboration.)	Global Water Partnership	(Global Water Partnership, 2015)
Regional climate change adaptation knowledge platform for Asia (Knowledge sharing, generating new knowledge, knowledge to policy and practice)	SEI ¹ , SENSEA ² , UNEP ³ , and AIT/UNEP RRC.AP ⁴	(AIT/UNEP Regional Resource Center for Asia & the Pacific, 2015)

¹ The Stockholm Environment Institute

² The Swedish Environmental Secretariat for Asia

³ The United Nations Environmental Program

⁴ The Asian Institute of Technology (AIT)/UNEP Regional Resource Centre for Asia and the Pacific

Moreover, evidence suggests that the existing adaptation projects mainly focus on immediate benefits and are therefore ineffective at addressing underlying causes of persistent vulnerability (Nelson, Adger, & Brown, 2007; Ribot, 2014). A regional study in the lower Mekong Region also found that adaptation initiatives in the region have been reactive rather than anticipatory or planned for (Neo, 2012). Many adaptation studies also suggest CCA and vulnerability reduction should not be done in respect to climate change alone (Adger et al., 2007; Preston, Mustelin, & Maloney, 2013; Smit & Wandel, 2006). Barnett and O'Neill (2010), therefore, argue that failing to incorporate adaptation into development can result in maladaptation, while Dubois et al. (2011) view adaptation as part of a comprehensive planning process. Further arguments regarding mainstreaming climate change are discussed in sections 3.1 and 4.1.

This research is supportive of wide recognition that adaptation should be integrated with national development, in a process that is referred as 'mainstreaming climate change', thus allowing harmony and synergy with the sustainable development of a country (Adger et al., 2007; Butler et al., 2014; Huq & Ayers, 2008). Mainstreaming climate change or mainstreaming climate resilience remains an evolving concept and there is no single best way of doing it in practice (Ayers, Huq, Faisal, & Hussain, 2014). Therefore, more empirical work on how such harmonisation can be realised are needed (Butler et al., 2014; Huq & Ayers, 2008). Additionally, there is a great demand for more empirical work regarding approaches for harmonising multi-scale policies and measures that facilitate the effective realisation of adaptation (Preston et al., 2013). This research aims to contribute to this knowledge gap while exploring the possibilities for Cambodia developing its own climate-informed development planning system.

1.2 Cambodia's Water Resources and Agriculture Development Policies and Plans

Cambodia's development plans mainly cover a five-year period (referred as medium-term development plans) and are arranged according to the government's legislator. These include the National Strategic Development Plan (NSDP) and line ministries' plans, for example, plans from MAFF and MOWRAM. The current NSDP covers the period from 2014 to 2018. At the time of writing this thesis, neither MOWRAM nor

MAFF had published an updated version of their strategic development plan, so the information provided in this research is from the last version, which is for the period from 2009 to 2013 (Royal Government of Cambodia, 2009b, 2011c). This section contains two subsections. The first part provides background information on the strategic goals and objectives of MOWRAM and MAFF in developing the sectors. The second part examines the extent to which climate change concerns were integrated into policy documents. Climate change mainstreaming in Cambodia is discussed in detail in Chapter 3 and 4.

1.2.1 Water Resources and Agriculture Development Goals

MOWRAM's *Strategic Development Plan on Water Resources and Meteorology 2009–2013* was developed with the overall goal of managing and developing Cambodia's water resources effectively, equitably and sustainably, ensuring that water-related disaster-induced vulnerabilities are mitigated and aqua-ecosystems are healthy (Royal Government of Cambodia, 2009b). The focuses of the strategy during this period included water resources development and flood and drought management. The construction and rehabilitation of irrigation networks and flood control systems were central to the strategy, which had a target of expanding irrigated rice paddy areas by 25,000 hectares per year (equal to one per cent of potential irrigated areas per year). The strategy also aimed to improve water resources and meteorological information management systems; administrative and human resource development; and related laws and regulations, such as the sub-decree on water users communities and the sub-decree on river basin management (Royal Government of Cambodia, 2009b).

The development vision of MAFF between 2009 to 2013 was to ensure that every Cambodian had enough dietary nutrition while safeguarding natural resources for future generations, thus contributing to the country's poverty reduction commitment (Royal Government of Cambodia, 2011c). Developed in response to this vision, the *MAFF Strategic Development Plan 2009–2013* aimed to increase agriculture productivity and diversification; reform land use planning, including mine clearance (for expanding the agriculture surface); reform the fisheries sector; and reform the forestry sector.

Promoting rice is central for agriculture development; in particular, growing enough not just to supply local demand but also for export. Horticulture and animal husbandry were also important components of the strategy, while the development of fisheries communities, aquaculture and post-harvest processing were key components for fisheries development during the period. For the development of fisheries and forestry, the strategy admitted there was a need for consensus among stakeholders in terms of development versus conservation of the subsectors. Institutional capacity development including research and education and the development of relevant laws and regulations were also targeted during the period to enable the strategy to be implemented effectively and efficiently (Royal Government of Cambodia, 2011c).

The Strategy for Agriculture and Water (SAW) was developed as a harmonised strategy for both sectors, meaning that the implementation of the strategy required close cooperation between MAFF and MOWRAM. A key focus of the strategy was to address food insecurity, thus reducing poverty in rural Cambodia. The vision of SAW was to “Ensure enough, safe and accessible food and water for all people, reduce poverty and contribute to economic growth while ensuring the sustainability of natural resources” (Royal Government of Cambodia, 2010f, p. 24). The strategy consisted of five programs: an institutional capacity-building and management support program for water resources and agriculture; a food security support program; an agriculture and agribusiness support program; a water resources, irrigation management and land program; and a water resources and agriculture research, education and extension program (Royal Government of Cambodia, 2010f, p. 25). The development of SAW was undertaken by a technical working group (TWG) on agriculture and water. A technical working group is a government–donor coordination body that assists and enables the implementation of national strategic development plans and aid effectiveness in Cambodia. TWGs are chaired by a key government organisation and facilitated by one of the key funding agencies for that respective sector.

The Strategic Planning Framework for Fisheries: 2010–2019 was developed to assist the Fisheries Administration for fisheries development. This strategic planning framework focuses on three main pillars: inland and marine fisheries; inland and marine

aquaculture; and post-harvest. Developing the pillars supports the long-term development vision for fisheries in Cambodia, which is the “Management, conservation, and development of sustainable fisheries resources to contribute to ensuring people’s food security and to socioeconomic development in order to enhance people’s livelihoods and the nation’s prosperity” (Royal Government of Cambodia, 2011d, p. 8). The development of the strategy was undertaken by a technical working group on fisheries.

1.2.2 Mainstreaming Climate Change into Water Resources and Agriculture Development Policies

The recent Cambodian water resources and agriculture development strategies discussed in the previous section acknowledge the impacts of climate change on these sectors. However, the acknowledgement of climate change impacts in MAFF’s strategic development plan 2009–2013 (Royal Government of Cambodia, 2010f) was inadequate and limited to a few lines of general statements, for example, it simply referred to “climate change impacts on the agriculture sector” without providing any analysis (Royal Government of Cambodia, 2010f, p. 1). Similarly, there was no climate change analysis in MOWRAM’s development strategy for 2009–2013 (Royal Government of Cambodia, 2009b). With dealing with floods and droughts as one of the key framing issues, MOWRAM’s strategy focuses on developing irrigation networks and flood control systems. However, the strategy does not provide any practical details, for instance, how the water resources management infrastructure will be designed in a way that can tolerate anticipated climate change impacts. The issue is further discussed in section 3.3.

SAW and the *Strategic Planning Framework for Fisheries: 2010–2019* included more climate change information. The strategies indicate climate change impacts are one of the threats to the agriculture and fisheries sectors. For instance, SAW acknowledges the impacts of climate change on food security in Cambodia and admits that the strategy needed to take the issue into account (Royal Government of Cambodia, 2010f). To do this, the strategy includes a brief review of climate change impacts specifically for the

Lower Mekong subregion where Cambodia is located. However, the climate change information in SAW was still not effectively transferred into any practical adaptation responses. The *Strategic Planning Framework for Fisheries* acknowledges the impacts of climate change, on especially fish habitats. The strategy therefore calls for more collaborative commitments from the Cambodian government via developing effective domestic climate change strategies as well as encouraging regional and international cooperation for addressing the issues (Royal Government of Cambodia, 2010e). One of the reasons that these policies have incorporated more climate change concerns may be because the policies were developed by TWGs where funding was available for technical assistance (i.e. international and local consultants).

1.3 Conceptual Frameworks

In order to develop the conceptual framework for this research, relevant concepts were identified and discussed. This section discusses the broad conceptual frameworks of this study, while more specific ones are discussed in Chapters 2 to 5. In this section, the fundamental concepts of CCA that stem from ‘vulnerability concepts’ are discussed. Basically, the core discussion concerning this founding concept relates to two key aspects for adaptation decisions: social versus biophysical vulnerability, and present versus future vulnerability. The discussion is then followed by an examination of some frameworks and relevant information and knowledge for planning or framing adaptation. As mainstreaming climate change has been acknowledged as an effective way of addressing climate change issues, relevant mainstreaming climate change framework is also briefly discussed in this section. This theoretical section ends with a discussion about the mechanisms and approaches for narrowing research and policy development. An outline of the conceptual framework that guided this study was designed according to this theoretical foundation.

1.3.1 Climate Change Vulnerability and Adaptation Concepts

Vulnerability is a central concept of climate change research and it originates from natural hazards and geography research (Füssel, 2005). The concepts of vulnerability have been employed in different fields such as social sciences, health and development studies (Brooks, 2003; Füssel, 2005). With its many broad applications and different definitions, implications and language, the term and its use can lead to some confusion. Brook (2003) stresses that it is important to specify vulnerable system(s), hazard or a range of hazards when discussing vulnerability. Hazard is defined as “physical manifestations of climate variability and change such as droughts, floods, extreme rainfalls and storms as well as long-term changes in mean values of climatic variables, potential shifts in climatic regimes and so on” (Brooks, 2003, p. 3). Additionally, because the vulnerability of any specific system changes over time and varies from location to location, Füssel (2005) suggests ‘scale’ and ‘timeframe’ should also be considered as qualifiers to facilitate discussion about vulnerability.

To improve clarification about the usage of the term vulnerability, Brook (2003) distinguishes between ‘social or inherent vulnerability’ and ‘biophysical or physical vulnerability’. Social vulnerability refers to the internal state (inherent characteristics) of the vulnerable system that makes it susceptible to a hazard or a range of hazards (Brooks, 2003). From a resilience perspective, vulnerability is also considered as the internal characteristics of a system (Nelson et al., 2007). Although social vulnerability is independent from hazards, it determines the outcomes of hazard events and in a human system it is referred to as ‘sensitivity’ (Brooks, 2003). Social vulnerability is determined by environmental, socioeconomic and governance factors such as poverty, equity, access rights to food and natural resources and housing quality (Adger et al., 2007; Brooks, 2003; Butler et al., 2014). The interaction between hazards and social vulnerability produces an outcome which is combined for total vulnerability, called biophysical or physical vulnerability (Brooks, 2003). In this respect, social vulnerability is seen as one of the determinants of biophysical vulnerability or, in other words, biophysical vulnerability is a function of hazards and social vulnerability (Brooks, 2003).

If there is a constant magnitude of hazards over time, social vulnerability can be reduced by increasing the adaptive capacity; however, appropriate time is required for the system to realise its adaptive capacity as ‘adaptation’ (Brooks, 2003). Adaptation is generally defined as the adjustments necessary to enhance a system’s capacity so that it can cope better with climate hazards and exposures (Brooks, 2003; Fussel, 2005). In this respect, adaptive capacity is the potential of a system to respond to hazards, thus it can be considered as one of the determinants of social vulnerability (Brooks, 2003). For a human system, adaptive capacity includes the assets, infrastructure, funding, institutional capacity and social capital that enable adaptation to hazards (Nelson et al., 2007; Smit & Wandel, 2006). Nelson et al. (2007) further argue that an ability to use the available resources effectively and efficiently is critically important for adaptation. However, if hazards increase severely and frequently, greater adaptation efforts are required and in that situation, although social vulnerability may be addressed, a human system is still likely to face risks from the hazard events (Brooks, 2003).

It is necessary to differentiate between present and future vulnerabilities (Brooks, 2003; Fussel, 2005). As explained by Preston and Stafford-Smith (2009), both biophysical and social determinants are subject to change, thus resulting in differences between present and future vulnerabilities (Figure 1.2). For instance, the changes in biophysical determinants such as temperatures, rainfall, evaporation and sea level associated with climate change may intensify future vulnerability. Similarly, changes in social determinants such as population growth, economic growth, changing values and changes in governance and policy influence human adaptive capacity in response to climate change (Preston & Stafford-Smith, 2009). Brooks (2003) points out that present vulnerability is a baseline for future vulnerability and is determined by past adaptation and the availability of current responding options. For sectors and areas that have suffered with present climate vulnerability, it is important to synergistically address both present and future vulnerability together (Fussel, 2007).

Planned adaptation with proper policies and strategies is suggested for addressing future vulnerability (Brooks, 2003; Nicholls et al., 2007; Veraart & Bakker, 2009). Preston and Stafford-Smith (2009) argue that adaptation should focus on the present state of social

determinants and future changes in biophysical factors (see Figure 1.2). Adger et al. (2005) also suggest that adaptation should aim to build the adaptive capacity of vulnerable systems and reducing vulnerabilities. The timescale for adaptations' implementation in responding to any hazards varies according to type of hazards (i.e. a discrete event such as a flood versus continuous changes such as variation in mean decadal rainfalls) and this determines the rate of reduction of biophysical vulnerability (Brooks, 2003).

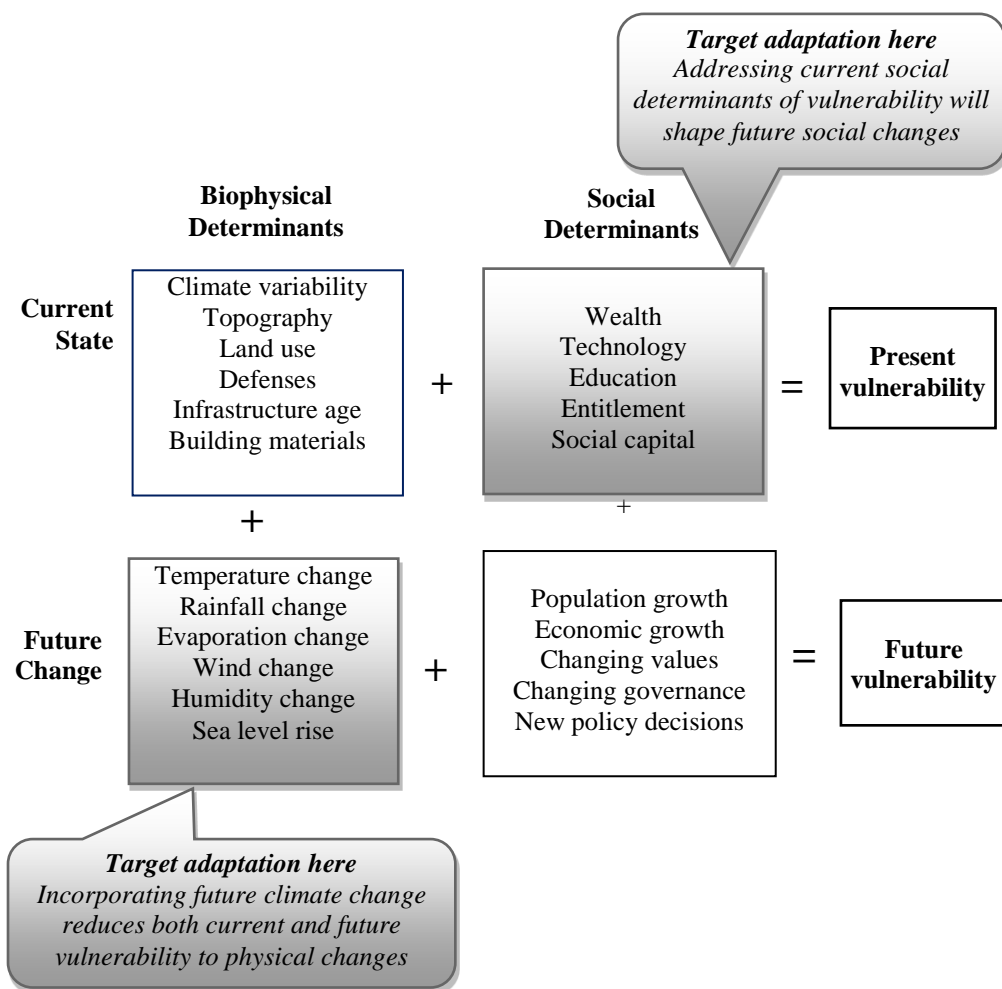


Figure 1.2 Relationships between present and future determinants of vulnerability and the appropriate targets of adaptation

Source: Preston and Stafford-Smith (2009, p. 18)

On a practical level, the selection of adaptation measures is critical and priority should be given to 'no-regrets' options (Linham & Nicholls, 2010) – those that provide 'net

social benefits' under all future climate change scenarios (Asian Development Bank, 2005; Preston et al., 2013). Both structural measures such as infrastructure and non-structural ones such as institutional change and capacity-building are required in order to adapt to climate change (The WB Institute, n.d-a; UNFCCC, 2006; Veraart & Bakker, 2009). It is recommended that adaptation should be socially acceptable, culturally compatible, environmentally sustainable and cost-effective (UNFCCC, 2006) and build on past experience (Füssel, 2007; Preston et al., 2013).

The role of monitoring and evaluation in measuring the effectiveness of adaptation implementation is essential (Lal & Thurairajah, 2011; LDC Expert Group, 2012; UNFCCC, 2006) and it is recommended that it should be done over decades (Linham & Nicholls, 2010). In the evaluation stage, multiple expert judgements supported by empirical observation and modelling projections are suggested to tackle the issue of uncertainty in projecting future climate conditions (Veraart & Bakker, 2009). The literature further stresses the importance of transparency in the process of selecting scientific tools for the evaluation exercise as well as in prioritising adaptation options (Veraart & Bakker, 2009).

In summary, a successful adaptation strategy does not only meet its objectives but also facilitates the ability of others to reduce their vulnerability (Adger et al., 2005). The success of adaptation is dependent on spatial and temporal scales (Adger et al., 2005; Nelson et al., 2007); for instance, some adaptation strategies may successfully reduce vulnerability in one particular area or meet one objective for a given period of time but do not necessarily sustain or are considered to be successful in other areas or sectors. Successful adaptation should therefore balance efficiency, effectiveness, equity and legitimacy: elements that are context specific and contested (Adger et al., 2005). These issues are discussed in more detail in Chapter 2.

1.3.2 Planning for Climate Change

In order to effectively plan for climate change, there are a number of aspects need to be addressed. An overall framework for planning for climate change has been outlined by Füssel (2007):

Planning for adaptation is about what should be done differently, more or less, by whom and with what resources and it is framed as: How will future climatic and non-climatic conditions differ from those of the past?; Do the expected changes matter to current decisions?; and What is a suitable balance between the risks of acting (too) early and those of acting (too) late? (Füssel, 2007, p. 268)

In the technical sphere, the framework proposed by Füssel takes into account changes of climatic conditions that may matter to current and future development, which is in line with some experts (cf. Preston & Stafford-Smith, 2009; Veraart & Bakker, 2009). The framework also points to the important concern of allowing appropriate time for implementing the adaptation. This is because planning for adaptation is cost-associated and decisions are made with high uncertainty, thus reasonable time is needed in order for stakeholders to learn and make necessary adjustments (UNFCCC, 2006; Veraart & Bakker, 2009). This concern is even more important for least developed countries like Cambodia, where institutional capacity, including research capacity, is very constrained (Dany, Bowen, & Miller, 2014; Kian-Woon et al., 2010; Royal Government of Cambodia, 2010f).

It is suggested that the planning for adaptation should be an iterative learning process (Figure 1.3) starting with scrutinising key information that will then be used to inform adaptation planning (Moss et al., 2008; UNFCCC, 2006; Veraart & Bakker, 2009). Some studies (e.g. Butler et al., 2014; UNFCCC, 2006) suggest that planning for adaptation should also take into consideration non-climatic factors that reflect the social vulnerability of a system. When planning, it is imperative the policy and development objectives of a country are taken into account (UNFCCC, 2006) as well as their technological feasibility (Käkönen, Lebel, Karhunmaa, Dany, & Try, 2014; UNFCCC, 2006).

Vulnerability assessment is a key starting point for adaptation planning because it generates relevant information for planning (Füssel, 2007; Fussel & Klein, 2006; Smit & Wandel, 2006). A vulnerability assessment analyses present climate change

vulnerability and ongoing adaptation measures, and scrutinises the available options, feasibility of implementation and possibility of alignment with national and other policy goals such as economic diversification, sustainable development and environmental protection (Fussel & Klein, 2006). Fussel (2007) further notes that vulnerability assessment identifies adaptation options in a way that incorporates current and future climate vulnerabilities into relevant policy concerns. Linham and Nicholls (2010) therefore recommend that local climate change impacts should be reviewed periodically. This implies that vulnerability assessment should be undertaken not only for informing adaptation planning design, but should periodically be undertaken to provide feedback concerning adaptation implementation so that improvements can be made.

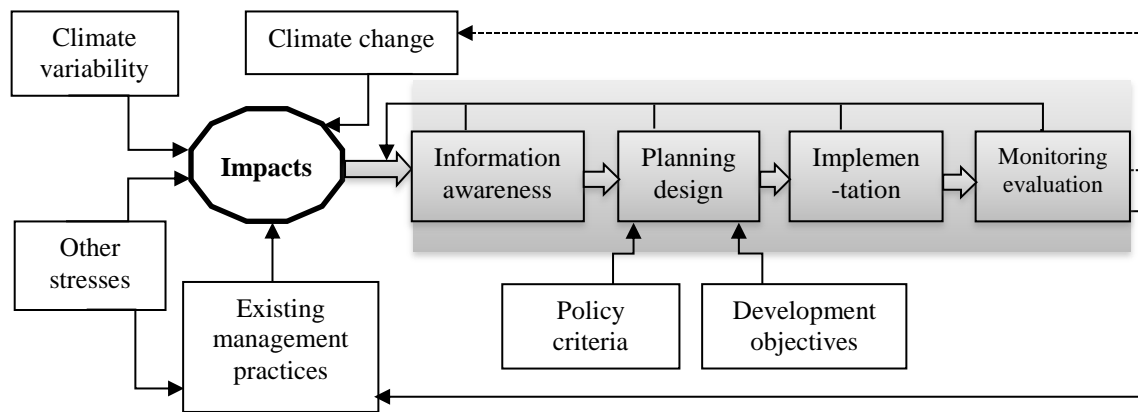


Figure 1.3 Iterative steps in planned adaptation to climate change

Source: UNFCCC (2006, p. 10)

In practice, CCA is more effective when it also addresses other vulnerability-contributing factors and, in most cases, adaptation projects rarely address climate-induced vulnerability alone (Adger et al., 2007; Butler et al., 2014; Smit & Wandel, 2006). For this reason, there have been a wide recognition of the importance of mainstreaming climate change. As results, some mainstreaming frameworks and approaches have been proposed to assist in this process.

The UNDP-UNEP's climate change mainstreaming framework is straightforward, focusing on three components: identifying entry points, integrating climate change concerns into policy development processes and implementation (UNDP-UNEP, 2011).

A proposed framework for mainstreaming climate change by the Government Group Network for Climate Change Mainstreaming is broader than UNDP-UNEP's one. It consists of three main components: an enabling environment covering political will and information services; policy and planning covering the policy framework, institutional arrangements and the financial framework; and projects and programs that translate the policy into actions (Pervin et al., 2013).

Ayers et al. (2014) have also developed an enabling framework for building countries' capacity to mainstream climate change that is composed of four important components: raising CCA awareness and building local scientific capacity; producing targeted scientific information to meet the need of different stakeholders; pilot CCA and mitigation activities; and integrating the lessons learned from earlier steps into existing national and local planning. These frameworks mainly focus on 'what' needs to or should be done rather than the processes of 'how' things can be done. Mainstreaming climate change issues and frameworks are discussed further in Chapters 3 and 4.

1.3.3 Linking Research and Policy Development

There are a number of barriers and challenges in narrowing research and policy development. These include the low absorptive capacity of policymakers for science and technology; the limited openness of politicians in developing countries; the election of policymakers based on specific policy initiatives with short-term goals, thus reducing the incentive to use research and science information (Jones, Jones, & Walsh, 2008); the different time scales of research and policy development (Finch, 1986; Jones et al., 2008); the status of the researchers, which may be lower than that of the policymakers, thus making it hard for researchers to exert influence on them (Finch, 1986); poor communication (Jones et al., 2008; Miller et al., 2010); and differences in ways of thinking, interests and language used between researchers and policymakers (Finch, 1986; Jones et al., 2008). Adger et al. (2005), however, argue that successful adaptation should support social learning, thus fostering collective actions.

In response to the abovementioned challenges, researchers have examined some applications such as the co-production of knowledge, knowledge intermediaries and research–policy dialogue. Vulnerability assessment is indicated as a platform facilitating social learning, thus the co-production of relevant knowledge, which eventually fosters collaboration among stakeholders (Preston et al., 2013; Yuen et al., 2013). To be effective, Yuen et al. (2013) suggests a number of lessons that should be taken on in every step of the assessment (Figure 1.4). The stakeholder’s engagement mechanisms and research communication strategies are further discussed in Chapter 5.

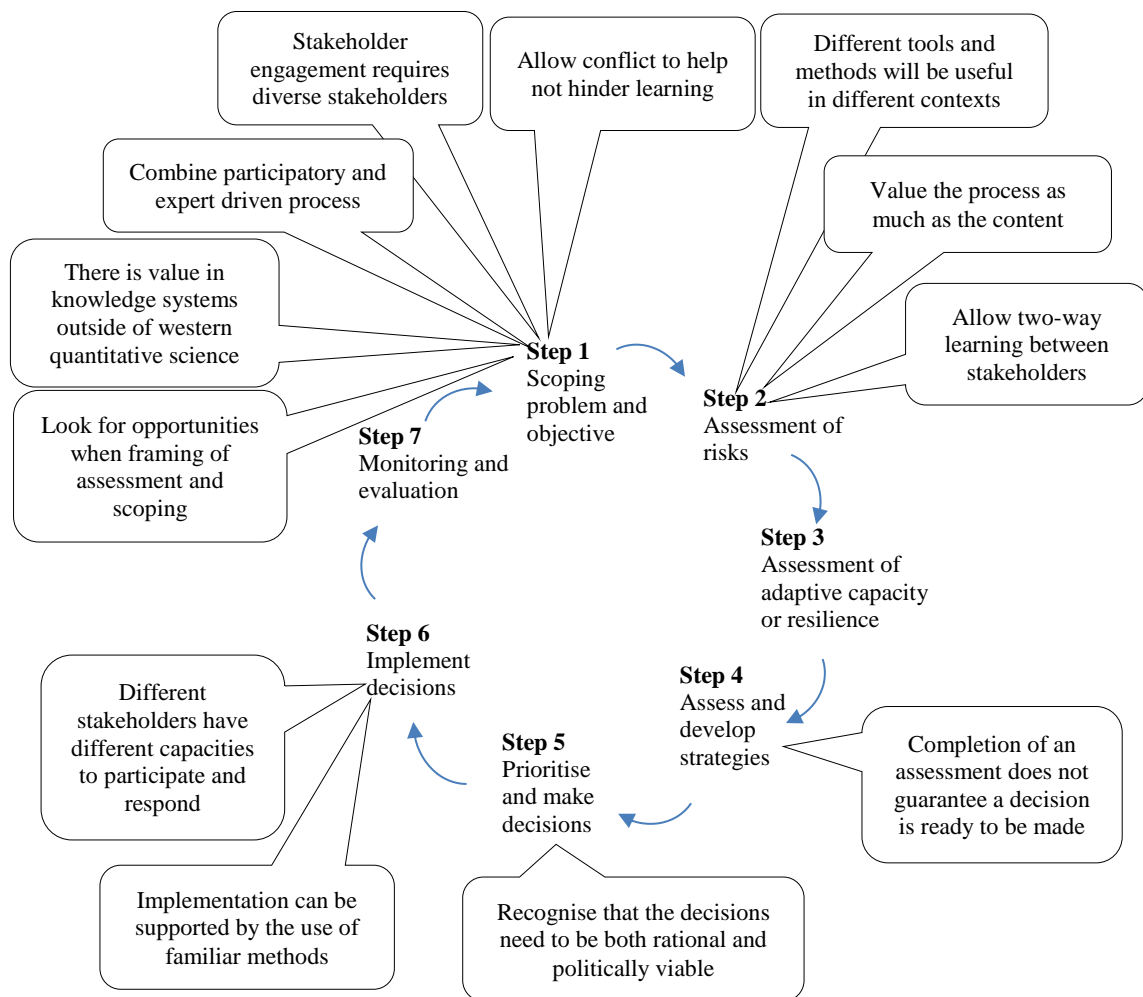


Figure 1.4 The main single loop lessons from the cases study

Source: Yuen et al. (2013, p. 576)

1.3.4 Knowledge and Information for Planning for Climate Change

The Trialogue Model of the relationships between policy–research–society suggests two stratum of knowledge that are important for informing policy development: the formal scientific knowledge that is produced by universities, research institutions, government agencies and consultants and an informal knowledge which is a compilation of citizen and indigenous knowledge that is generally understood by society (Geoffrey, 2007). Veraart and Bakker (2009) also suggest that a scientific network be composed of universities, research programs and research institutions; however, this structure varies from one country to another. For instance, in Cambodia scientific capacity is fragmented, with many research projects implemented by the policy stakeholders (the government ministries and development partners (DPs)) (Dany, Bajracharya, Lebel, Regan, & Taplin, 2015). Also, the scientific capacity of local academic institutions is not strong in Cambodia. When this happens, the scientific network may be dominated by those from government and DP organisations.

Relevant climate-related information for decision-makers includes present climate impacts, vulnerable systems and their geographic distributions (Carter et al., 2007; Dubois et al., 2011), future potential impacts under projected climate change (Butler et al., 2013; Lobell et al., 2008) and potential alarming impacts (Carter et al., 2007). Research (e.g. Adger et al., 2007; Lobell et al., 2008; Smit & Wandel, 2006) indicates the importance of information on the cost–benefit analysis of adaptation options. Adger et al. (2005) further argue that the costs of adaptation can be reduced with more accurate information about future climate change. An analysis of opportunities related to climate change is also necessary (Carter et al., 2007).

An analysis of climate change impacts, vulnerability and adaptation should be based on the climate, atmospheric and carbon cycle projections as well as emission and socioeconomic scenarios (Fussler & Klein, 2006; Moss et al., 2008). The Atmosphere–Ocean General Circulation Model is a fundamental tool in projecting the behaviour of the global climate system and for producing global and regional climate and climate change projection information (Christensen et al., 2007). In the context of water management, the scientific tools that can be used to provide knowledge and information

for policymakers on present and future impacts include weather forecasting, climate scenarios, time-series analysis and risk assessment (Veraart & Bakker, 2009). These present a challenge for a country like Cambodia where scientific capacity is constrained.

Preston and Stafford-Smith (2009) observe that integrated assessment, a modelling study with different scenarios presenting different futures, may be able to usefully provide information covering both the biophysical and socioeconomic status of a system. However, they indicate that vulnerability assessment that is directed towards planned adaptation is often in the form of policy analysis that covers the cost–benefit analysis of adaptation options or multi-criteria analysis. As well as generating relevant information for adaptation planning, Füssel and Klein (2006) view vulnerability assessment as an emerging area of knowledge about climate policy and science. They observe that vulnerability assessments are conducted to improve scientific understanding of climate sensitive systems under changing climate conditions, to identify and prioritise the political and research agenda of vulnerable systems, to develop adaptation strategies and to specify targets for the mitigation of climate change. In conclusion, local vulnerability assessment is important for informing adaptation planning; however, such local Cambodian related studies are limited (Dany et al., 2014; Mekong River Commission, 2009) therefore alternative information sources are necessary.

Relevant scientific information can be obtained from various sources. For instance, the scientific information on anthropogenic climate change on a global and regional scale is synthesised regularly by the Intergovernmental Panel on Climate Change (IPCC). The IPCC is the leading scientific body in the area of climate change and has three main Working Groups. Working Group I focuses on global and regional climate-related information and projections and the advancement of General Circulation Models. Working Group II advances the knowledge and technologies related to impacts, vulnerability, adaptation and assessments methods and Working Group III focuses on CC mitigation. The Fourth Assessment Reports of the IPCC was released in 2007 and the Fifth Assessment Reports have recently been released. As well as the IPCC, United Nations' bodies such the UNFCCC, WB, ADB, UNDP; and academic publications have also provided a great deal of climate change relevant information. Although the information is generic, it is still relevant to the Cambodian context.

1.4 Research Goal and Objectives

Given the many limitations that Cambodia confronts, including a lack of relevant information, poor cooperation among CCA stakeholders and weak institutional capacity in general (Dany et al., 2014), developing climate-informed development planning is a critical challenge. Nevertheless, it is important to support the sustainable development of the country in the face of climate change. At a policy implication level, this research aims to explore the possibilities for Cambodia to develop its own climate-informed development planning system. This research also aims to contribute to the abovementioned knowledge gaps (see Section 1.1). The overall research question of this study is ‘How can climate-informed development planning in Cambodia’s water resources and agriculture sectors be developed and strengthened?’ Correspondingly, the following specific objectives were set for this research. A more detailed discussion of each of the specific objectives is provided in each of the respective chapters.

1. To examine the challenges and opportunities for practicing climate-informed development planning in Cambodia, with specific focus on potentials for improving existing climate change institutional arrangement and processes.
2. To assess the mainstreaming of climate change into Cambodia’s national development planning and examine pathways for effective mainstreaming.
3. To evaluate climate-informed development planning using community knowledge.
4. To analyse mechanisms for narrowing the gaps between research and policy development in Cambodia.

The formulation of the research objectives was guided by the gaps from previous studies (e.g. Ayers, Huq, Wright, et al., 2014; Lebel et al., 2012; Pervin et al., 2013). For instance, a Government Network for Climate Change Mainstreaming argues that that it is crucial to develop the approaches and capacity that are embedded in the existing planning system in order to effectively mainstream climate change (Pervin et al., 2013). Gregory et al. (2013) note the need to examine policy cycles, while Lebel et al. (2012) suggest examining the development planning process in order to identify

appropriate pathways for effectively integrating climate change concerns into development policies and plans. Following these suggestions, this research investigates Cambodia's planning systems at both the national and subnational levels. Moreover, given the important role of institutions and governance processes in integrating climate change concerns into development policies (Adger et al., 2005; Ayers, Huq, Wright, et al., 2014; Lebel, 2014), this study also examines the potentials for improving Cambodia's existing climate change institutions, in terms of their arrangements (the representation of key actors) and the processes in sharing responsibilities and resources, thus facilitating collaboration among stakeholders. The relationships between climate change institutions and national development planning's stakeholders was investigated in terms of the services and engagements that have been exchanged between the two groups of stakeholders.

1.5. Conceptual Framework for this Study

Drawing from the broad conceptual frameworks discussed earlier (section 1.3), the following framework was developed for this research on Cambodia. The framework acknowledges the importance of five key components that are interconnected (illustrated in Figure 1.5). The components of the framework are key actors and institutional arrangement, institutions and governance processes, stakeholder's engagement and research communication strategies, enabling factors and the need to identify entry points for integrating climate change concerns into development policies and plans.

The need to identify entry points in the policy and planning process should be central to integrating climate change concerns into development policies and plans. This targeted approach guides the integration process efficiently and effectively. Identifying entry points is also one of the strategic components of the UNDP-UNEP climate change mainstreaming framework (UNDP-UNEP, 2011). In order to identify the appropriate entry points, Lebel et al. (2012) recommend examining the development planning process, while Gregory et al. (2013) suggest examining policy cycles. Such analysis also provides insights into the institutions and governance processes as well as

institutional capacity in undertaking climate change actions, thus informing a decision on what climate change action should be carried out (Willems, 2004). Further discussions and empirical work on this issue are in Chapters 3 and 4.

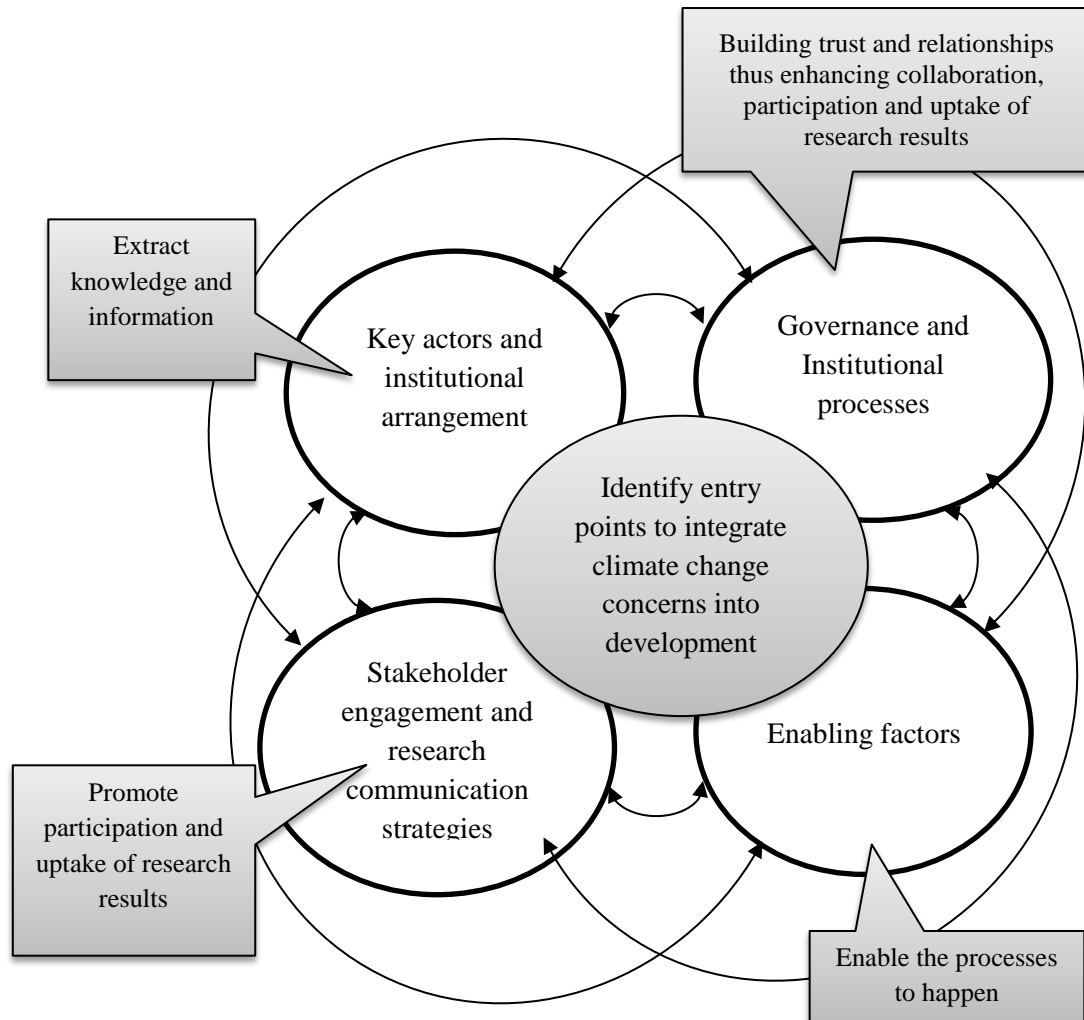


Figure 1.5 Conceptual framework for this study

Source: Author, 2012

Appropriate institutions and governance processes are crucial in the process of mainstreaming or planning for climate change (Adger et al., 2005; Nelson et al., 2007; Pervin et al., 2013). This is because planning for climate change requires participatory processes involving a wide range of stakeholders at multiple levels (Adger et al., 2005; Daniell et al., 2011; Thomas & Twyman, 2005). Effective stakeholder engagement processes are therefore necessary for planning for climate change, especially in

promoting collective actions and facilitating social learning (Daniell et al., 2011; LDC Expert Group, 2012; Preston et al., 2013). Good governance and institutional processes can motivate stakeholders' participation as it promotes trust and relationship among stakeholders (Fukuyama, 2002). Adger et al. (2005) thus conclude that successful adaptation should balance efficiency, effectiveness, equity and legitimacy. These four factors are elements of good governance and are context specific and contested. In sum, the prime aim of this component in this study's framework is to enhance relationships and trust among stakeholders, thus facilitating collaboration among stakeholders and enhancing an uptake of research information for development policy. Further discussions and empirical work on these issues can be found in Chapters 2 and 4.

An overall aim of having the appropriate institutional arrangement and relevant key actors in this study's framework is to extract the relevant knowledge and information to inform relevant decisions. Planning for climate change does not only need cooperation from a broad range of stakeholders but also requires multi- and interdisciplinary experts due to its cross-cutting nature and because decisions are made with high uncertainty (Dessai & Hulme, 2007; Dubois et al., 2011; The World Bank Group, 2010). For instance, a number of experts from different scientific backgrounds, which include climatology, economics, human geography, mathematical modelling and policy analysis, are required for undertaking vulnerability assessment (Fussler & Klein, 2006). Veraat and Bakker (2009) further recommend that the role of the organisation facilitating the boundaries between research and policy development should be carefully designed, taking into account the historical context of existing policy and its user characteristics, societal networks and the scientific system that is in place. Further discussions and empirical work on these issues are in Chapter 2 and 4.

One of the main purposes of including stakeholder's engagement and research communication strategies in this study's framework is to promote the participation and uptake of research results or other forms of evidence for adaptation policy development. Given the fact that planning for climate change requires relevant and available information from either scientific bodies or community knowledge, appropriate research communication strategies are also necessary (Finch, 1986; Miller et al., 2010). A two-

way communication process between scientific bodies and policy stakeholders is effective in translating research information into policy applications (Geoffrey, 2007). Introducing knowledge intermediaries is another mechanism that enables the linking of research and policy development (Dobbins et al., 2009; Fisher, 2010; Jones, Jones, Walker, & Walsh, 2009; Meyer, 2010). Vulnerability assessment is suggested as an effective platform for facilitating social learning thus promoting the use of research results (Yuen et al., 2013). Further discussions and empirical work on these issues are in Chapters 4 and 5.

The effective mainstreaming of climate change needs an enabling environment, especially funding, policy frameworks and institutional capacity. A number of studies (cf. Adger et al., 2007; Adger et al., 2005; LDC Expert Group, 2012) point to lack of resources as one of the key constraints in adaptation work. Therefore, Lemos and Morehouse (2005) indicate the important role and collaboration of funding agencies with academic institutions and policymakers in undertaking vulnerability assessment in order to produce meaningful strategies to respond to climate vulnerabilities. Also, the issue of the lack of local expertise in least developed countries is stressed in many studies (e.g. Käkönen et al., 2014; Willems & Baumert, 2003), therefore institutional change and capacity-building are required in order to adapt to climate change (The WB Institute, n.d-a; UNFCCC, 2006). At a community level, these enabling factors enhance their adaptive capacity to better address climate hazards (Nelson et al., 2007; Smit & Wandel, 2006). The WB Institute (n.d-b), on the other hand, points to responsibility, accountability and coordination as enablers for enhancing the institutional environment. Further discussions and empirical work on these issues are in Chapters 2 to 5.

In conclusion, planning for climate change is an evolving idea stemming from vulnerability concepts. The nature of planning for climate change reflects theories of changes in general. As defined in the literature (e.g. Adger et al., 2007; Nelson et al., 2007), the adaptation process is a deliberate change from marginal adjustment to transformation processes. Moreover, the concept of planning for climate change relates to institutional improvements. A number of studies (cf. Adger et al., 2005; The WB Institute, n.d-a; UNFCCC, 2006; Veraart & Bakker, 2009) point to the importance of

positive institutional change in order to adapt to climate change. Fussel (2007) thus concludes that adaptation requires new attention and action from development stakeholders who have not taken climate change vulnerability into account in their past decisions, implying that new response measures are needed in the face of climate change. From a planning point of view, it is an evolution from traditional planning practices that rely on experience and observation to a more climate evidence-based practice that relies on scientific research. Likewise, scientific research, information networks, capacity-building and awareness-raising are crucial for planning for climate change (Fussel & Klein, 2006; Huq & Ayers, 2008; Veraart & Bakker, 2009).

1.6 Study Design and Methods

Utilising qualitative methods was seen as an appropriate approach for this study, as the strength of qualitative research is its ability to uncover things that are not apparent. Babbie (2005, p. 299) describes qualitative research as “a hands-on process, which involves going to the scene of the action and checking it out.” It is therefore well suited to the type of policy investigation where comprehensive perceptions need to be collected. Finch (1986) states that qualitative research has two prime strengths for policy-oriented research: it can provide descriptive insights with a range of evidence and it can be complementary to quantitative analysis.

The investigation in this research was exploratory, wherein institutional ethnography was applied and complemented by case study methods. The overall framework for the study is presented in Figure 1.6. Institutional ethnography is a process consisting of interviews, observations and document review where individual personal experiences are used as the basis for understanding institutional practices (Babbie, 2005). The case study method involves carrying out an in-depth investigation of the real-life context of an individual, group, organisation, phenomenon or project, relying on multiple sources of evidence (Yin, 2009).

Yin (2009) suggests that multiple case studies, even only with two cases, are preferable to a single case study as they provide substantial analytical benefits. Therefore, two

CCA projects were chosen as case studies for this research: Climate Resilient Water Management and Agricultural Practices in Rural Cambodia (referred to as National Adaptation Program of Action on Climate Change-Follow Up or NAPA-FU), and Local Government and Climate Change (LGCC). Both case study projects are designed as multiple-embedded case studies. Convergent evidence provided stronger confidence in generalising the findings (Yin, 2009). More information about the case study projects is in Chapter 4.

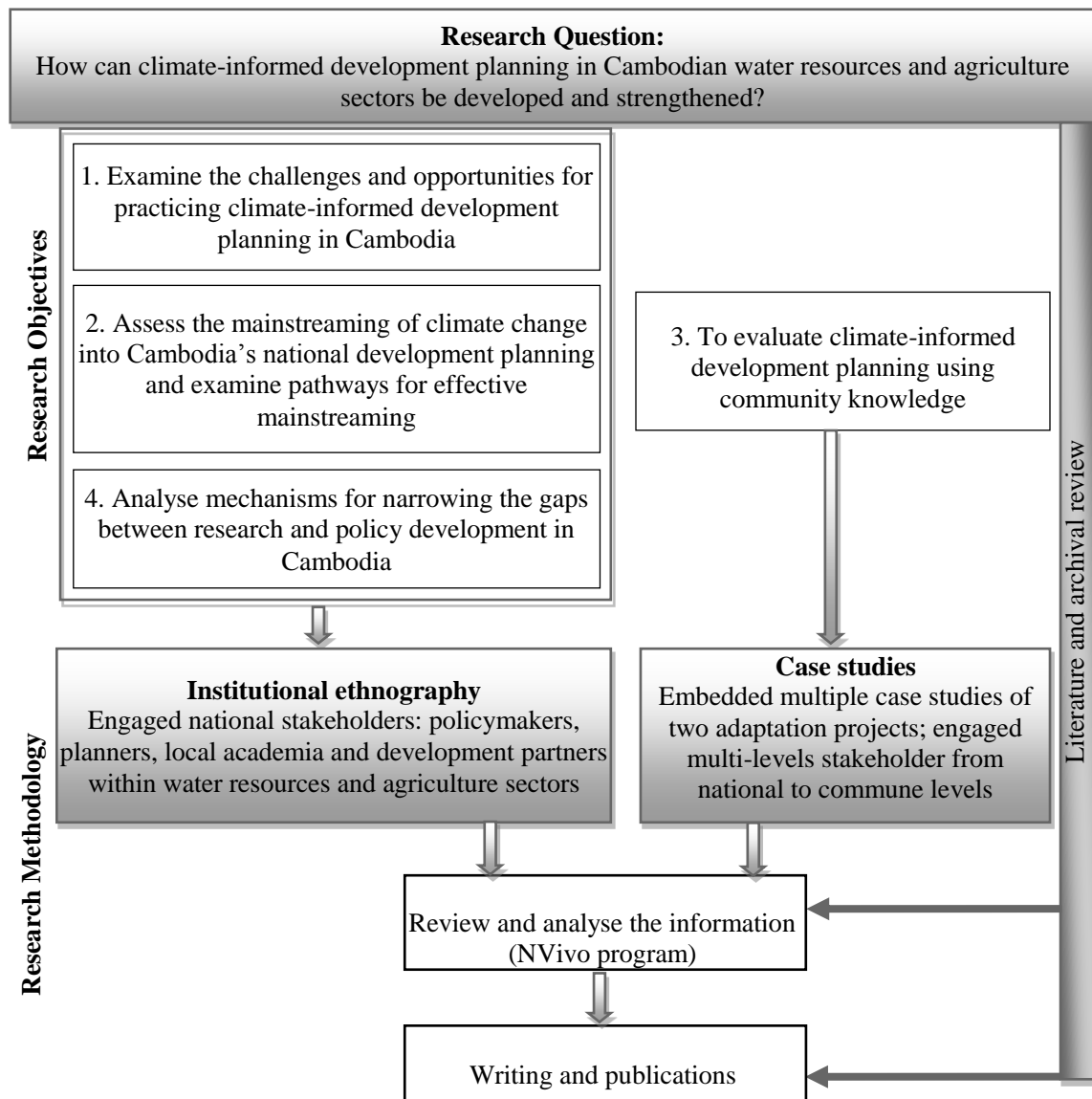


Figure 1.6 Research framework

As indicated by Kumar (2005), in social science, research respondents (i.e. those who can provide information to the researcher to understand the issues being investigated) can be individuals, groups or communities, depending on the profession they belong to. As this study's scope was within the water and agriculture sectors, officials who were in charge of or were actively involved in planning in these areas. This research therefore targeted relevant officials from government ministries, DPs and local academic institutions (see Appendix D).

Four ministries: MAFF; MOWRAM; MOE; and the Ministry of Planning were targeted for this study. MAFF has four technical divisions of which only two (the General Directorate of Agriculture and the Fisheries Administration) were included in this study. The respondents from MAFF and MOWRAM targeted were those who involved in their respective ministry planning process: the directors or/and deputy directors of the departments of planning, and specialised departments (e.g. Department of Rice). The General Directorate of Planning of the Ministry of Planning, which coordinates the development of national strategic development plan, was also recruited. The CCD of the MOE, which coordinates the development of national climate change strategy and manages most of adaptation resources, was also selected.

The selection of respondents from DPs targeted those in key funding agencies for water resources and agriculture and/or adaptation work, and relevant non-governmental organisations (NGOs). For instance, the UNDP, WB, ADB, the European Union, Swedish International Development Agency, and Danish International Development Agency were recruited for this study. The organisations play comparatively important roles in Cambodian adaptation strategies and implementation, as noted by the Royal Government of Cambodia (2010d). It was therefore seen as necessary to also obtain their perspectives, which may be different from or complementary to government perspectives.

Additionally, since the study addresses the issue of climate change science, it was seen as important to gain perspectives from science-related bodies (local academic institutions) that have a role in producing and disseminating information to relevant

stakeholders. The selection of academics was based on their relevant specialisations (e.g. academics from the Royal University of Agriculture (RUA), Cambodian Agriculture Research and Development Institute, and the Institute of Technology Cambodia).

The respondents were selected using the purposive and snowballing techniques and were approached through the networks of the author. Purposive sampling was appropriate for this institutional ethnography research because it allowed for the recruiting of respondents who had comprehensive work experience from their organisations and who could share their insights and perspectives. The snowballing approach was also utilised in this study to allow for the selection of additional respondents who were suggested by some of the respondents. This study was approved by the Bond University Human Research Ethics Committee, Australia (Protocol Number RO1430) (see Appendix A).

To facilitate the institutional ethnography research, an interview schedule that was framed to collect information for Research Objectives 1, 2 and 4 was developed to guide the interviews (see Appendix B). Given the length of the full interview schedule for the institutional ethnography research, respondents were only asked questions that were relevant to their areas of knowledge. For instance, respondents from academic institutions were not necessarily asked about national development planning practices but rather asked about research projects, communication strategies and institutional applications in terms of narrowing research and policy development. Similarly, in order to facilitate the collection of case study information and ensure the reliability of the study, case study topics were developed as suggested by Yin (2009). These are summarised in Table 1.2. Following the topics, an interview guide for the case study is elaborated to collect information for Research Objective 3 (see Appendix C).

To arrange the interviews, individuals were contacted by email or official letter from the Royal University of Phnom Penh, the researcher's employer in Cambodia. The purpose and objectives of the study were explained clearly during the initial contacts. An explanatory statement about the research was also attached to the official letters or emails which included more information about the study. Interviews were only done

with the respondents' full consent, including the consent of their employment superiors when required. A written form of consent which follows Bond University's Research Ethics procedures was developed to allow for respondents to sign their agreement (see Appendix A). However, as signing a written consent is not a cultural norm in Cambodian society, verbal consent was also accepted.

Table 1.2 Case study topics and sources of evidence

Case study topics	Sources of information
Institutional arrangement for projects implementation	Interviews, direct observations, project documents, progress reports
Climate change related capacity-building and awareness-raising	Interviews, training manuals, project documents, progress reports
Climate-related information generation: tools, processes and information	Interviews, climate change related study reports, project document, progress reports
Applications and integration of climate concerns into relevant decision-making and planning process	Interviews, participative and direct observations, planning documents, progress reports
Implementation of CCA measures	Interviews, direct observations, visit to projects' physical artefacts, project documents, progress reports
Local development planning process	Interviews, relevant policy documents

The interviews commenced with the researcher briefly informing the interviewees about the study's objectives, the interview process and timing. The confidentiality of the shared information, thoughts and perceptions was guaranteed through verbal agreement as well as a written consent. With agreement from respondents, which most gave, digital recording was used to supplement written note-taking. Sufficient flexibility was allowed during the interviews so that additional questions could be asked if necessary according to what emerged from the conversations. As Babbie (2005) points out, a qualitative interview is a conversation whereby the researcher triggers the conversation with questions on the study topic and ideally does not use more than five per cent of the interview time for asking the questions. Moreover, Babbie (2005) also notes that it is important to adopt and respect the respondents' beliefs, at least temporarily, in order for

the interviewer to be immersed in the investigation. This advice was taken into account during the interview process.

Each interview for the institutional ethnography research took about 60 minutes. Follow-up interviews or queries were conducted for a small number of respondents where the first interview did not provide sufficient information. Also, there were a few respondents who had comprehensive knowledge and experience that could not be covered sufficiently in one interview, so follow-up interviews were organised. The interviews for the case study generally took about 90 minutes. The interviews were conducted by the researcher in Khmer, the local language. Most of the interviews for the institutional ethnography research took place in the respondents' offices; however, a few of them were undertaken at cafes when that was a more convenient location for the respondents. The interviews for case study were undertaken at the projects' head offices for the project management teams, while interviews of provincial project officials were mainly at restaurants and local people's houses during their visits to the project's sites for the NAPA-FU, and at the provincial government buildings for the LGCC. The interviews with local governments were held at local government buildings. Ensuring an appropriate setting for the interviews was considered necessary to minimise possible bias.

A total of 59 interviews were conducted for this research. For the institutional ethnography research, 41 interviews (primarily one-on-one) with 44 respondents were conducted between July 2012 and April 2013. Twenty-two of the respondents were from government organisations: MAFF, MOWRAM, MOE and Ministry of Planning. Twelve of the interviewees were from academic institutions, with the remaining respondents from DPs. The respondents' profile is summarised in the Appendix D. For the case study, a total of 18 interviews were conducted with 27 respondents from both projects (Table 1.3). The interviews were done between February and April 2013. The interview respondents were members of the project management teams at the national level, the project implementation units at the provincial level, and the district and commune governments at the local level.

In addition to the interviews, the researcher participated in a number of relevant meetings and workshops at national level, for instance, meetings related to climate change grant mechanisms organised by the Cambodia's Climate Change Alliance and a workshop on CCA beyond 2015 organised by the UNDP. For the case study, the researcher took part in a number of meetings with different groups of beneficiaries of the NAPA-FU project, for example a rice seeds saving group, and by participating in planning and project prioritisation workshops of the LGCC project. Direct observations were conducted throughout the interview process with respondents, and visits to project sites and artefacts (e.g. pumping wells with solar panels of the NAPA-FU project, and rural roads of the LGCC project). The physical artefacts of both projects were visited, in the Don Kao municipality and Borey Chhulasa district in the Takao province for the LGCC project and the Chhum Kasan district of the Preash Vihear province for NAPA-FU project. An analysis of archival information, such as project documents, progress reports, training manuals and related planning documents, was undertaken as necessary.

Table 1.3 Breakdown of interviews and respondents by institutional level and case study project

Respondents' institution	NAPA-FU		LGCC	
	No of Interviews	No of respondents	No of Interviews	No of respondents
National level (management office)	2	2	2	2
Provincial level (implementation units)	6	6	3	3
Local level (implementation and primary beneficiaries)	1	2	4	12
Total	9	10	9	17

In summary, this chapter provides a rationale (statements of problem) underlining the significance of the research for Cambodia's CCA and development policies that clearly contributes to the sustainable development of Cambodia as well as other countries that have similar socioeconomic, cultural and political contexts. The chapter also includes a conceptual framework that was developed to guide the study toward meeting the research's goal and objectives.

The following chapter discusses the challenges and opportunities for practising climate-informed development planning in Cambodia, focusing on the potential for improvements in Cambodian CCA governance and institutions, thus facilitating more climate-informed development planning.

2. Challenges and Potentials for Climate-Informed Planning in Cambodia

2.1 Introduction

Planning for climate change implies planning that uses information on recent and future climate change to review the suitability of current plans and policies (Füssel, 2007; Preston & Stafford-Smith, 2009; Veraart & Bakker, 2009). Füssel (2007) argues that vulnerability assessment is a key starting point for adaptation planning as it identifies adaptation options in a way that incorporates recent and future climate vulnerabilities into relevant policy concerns. Good collaboration among climate scientists and researchers, policymakers, planners and practitioners are therefore essential for planning for climate change (Füssel, 2007; Veraart & Bakker, 2009). Planning for climate change become effective if it is integrated with other development policies and strategies (Dubois et al., 2011; Huq et al., 2004; Smit & Wandel, 2006) which implies that a wide range of stakeholders from multiple levels are needed.

Because planning for climate change required good collaboration among a wide range of stakeholders, appropriate institutions and good governance are required for adaptation. Lebel (2014) argues that institutions and governance processes are important for effectively narrowing CCA research and practices. Adger et al. (2005) supports this, arguing that the success and sustainability of adaptation relate to positive institutional changes. It was also found that climate change institutional development in Cambodia, especially the elevation of the Office of Climate Change to the Department of Climate Change and the establishment of the National Climate Change Committee (NCCC) positively influenced CCA work in the water and public health sectors (Bowen, Miller, Dany, McMichael, & Friel, 2013).

Equity is a central concern in CCA governance (Adger et al., 2005; Nelson et al., 2007). It is a concern because adaptation is a decision-making process requiring participation from a wide range of stakeholders at multiple levels, and that without such participation there are risks that only narrow and powerful interests are served (Adger et al., 2005;

Butler et al., 2013; Daniell et al., 2011; Thomas & Twyman, 2005). The issue of equity arises in both CCA decision-making processes and outcomes. In terms of process, the fairness of institutions and procedures is influenced by representations and respect of individual values and views in CCA decisions (Nelson et al., 2007). Adger et al. (2005) further argue that the issue of fairness relates to the distribution of power within institutions in managing CCA resources. The issue of equity in outcome refers to fairness regarding the sharing of benefits from adaptation policies and the distribution of vulnerability across sectors and locations (Adger et al., 2005; Lebel, Nikitina, & Manuta, 2006; Nelson et al., 2007). A practical example that occurred in Cambodia was the conflicts over the issue of water development for agriculture and the fisheries, resulting in the closure of many community-based water user groups. These conflicts create another governance issue, legitimacy, which refers to the level of acceptance of participants and non-participants of CCA-related decisions and policies (Adger et al., 2005).

Some mechanisms have been developed to trigger cooperation and social learning among CCA stakeholders, for example co-production of knowledge (Armitage, Berkes, Dale, Kocho-Schellenberg, & Patton, 2011) and vulnerability assessment (Preston et al., 2013; Yuen et al., 2013). Through these mechanisms climate scientists and researchers, policymakers, planners and practitioners work collaboratively. In the process of vulnerability assessment, climate scientists and researchers evaluate the suitability of current policies, plans and practices for the future (Füssel, 2007; Lemos & Morehouse, 2005; Veraart & Bakker, 2009; Yuen et al., 2013), while practitioners also have a vital role in sharing information and practical experience relating to CCA implementation (Füssel, 2007). Policymakers also have important role in the assessment process in assisting in identifying and prioritising CCA policies for their sectoral or local development (Füssel, 2007).

In addition to the institutional mechanisms, institutional capacity is imperative for CCA. Käkönen et al. (2014) argue that the availability of CCA expert technologies makes CCA governable. Willems (2004) also points to institutional capacity as one of the criteria in selecting climate actions. Good performance and relevant skills of individuals

are basis for policy implementation (Willems & Baumert, 2003), therefore it is essential that personnel have good motivation and the right incentives (Jutting, 2003; Lebel et al., 2006; Pretty & Ward, 2001; Willems & Baumert, 2003). At a broader level, the following factors have been shown to influence institutionalising capacities: poverty, corruption, lack of financial resources, lack of public participation and awareness, and administrative barriers (Lebel et al., 2006). Storbjork and Hedren (2011) also point to the necessity of having an effective political administrative system for addressing CCA institutional conflicts.

Planning for climate change is essential for Cambodia's development, especially for the water resources and agriculture sectors. The sectors are connected and highly sensitive to climate given the fact that most of agriculture is rain-fed, and water resources management infrastructure is underdeveloped. Looking at the impacts of projected climate change in Asia, both sectors are predicted to be highly vulnerable (Cruz et al., 2007). This chapter aims to explore opportunities for Cambodia to practice climate-informed planning for the sectors, with a central discussion on improving CCA institutions and governance. In order to facilitate the discussion, an analysis of the climate change institutions is provided first.

2.2 Climate Change Institutions in Cambodia

Since ratifying the United Nations Framework Convention on Climate Change in 1995, climate change institutions have been progressively developed in Cambodia. The MOE was formalised as the country's focal point for the convention. In 2003 the Office of Climate Change was established within MOE with the following mandates: to promote climate change related research, capacity-building and awareness-raising; enhance cooperation with relevant organisations in implementing the climate change framework convention; and provide information to the government and assist them in preparing their position for the international negotiation (Royal Government of Cambodia, 2003).

Recognising the important role of the Office of Climate Change in facilitating climate change related activities, it was promoted to the CCD in 2009 with five offices (Figure

2.1) (Royal Government of Cambodia, 2009a). In addition to their initial mandates, the CCD is authorised to develop national policies, strategies, action plans and legal instruments related to climate change in cooperation with relevant organisations; facilitate the mainstreaming of climate change into national and sectoral development plans; mobilise and manage financial resources, especially grants for implementing climate change policies and plans; manage carbon credits in cooperation with relevant organisations; and promote the monitoring and evaluation of climate change related projects (Royal Government of Cambodia, 2009a).

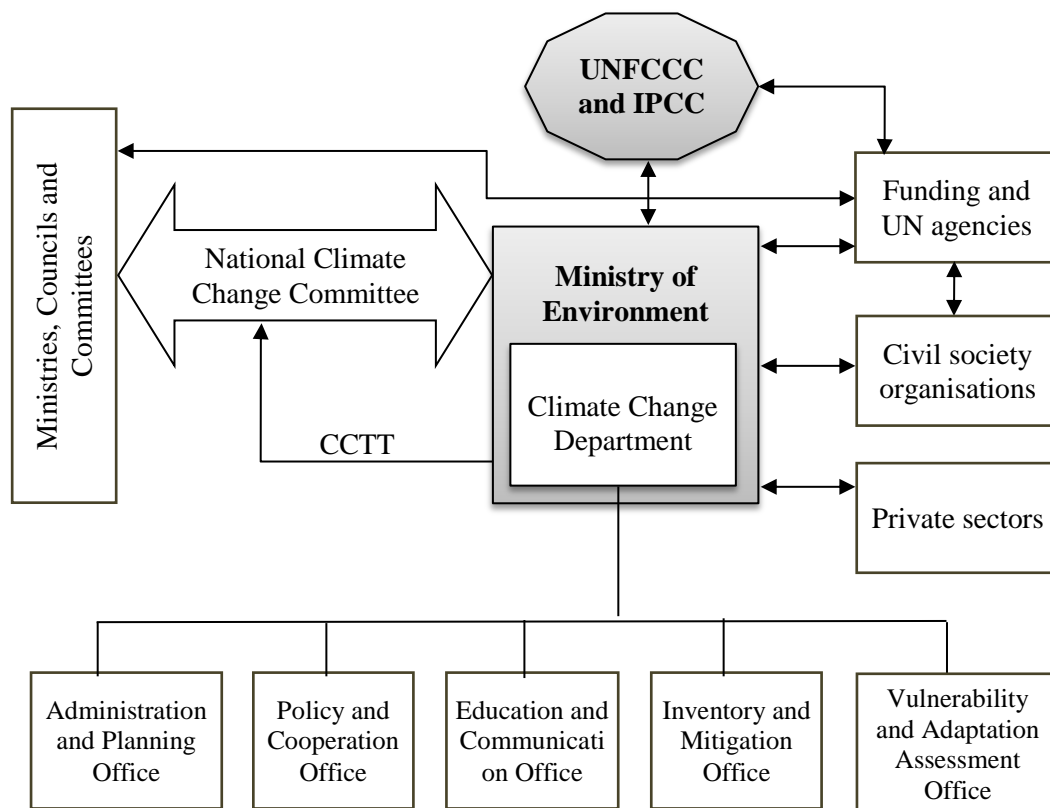


Figure 2.1 Formal climate change institutions and relationship in Cambodia

Source: Author, 2013

In 2006, NCCC, a high-level decision-making interministerial committee, was established and mandated to facilitate cooperation among line ministries to meet climate change related commitments (Royal Government of Cambodia, 2006c). The formulation of the interministerial committee is seen as necessary for climate change

commitments in Cambodia and, as Paavola and Adger (2005) point out, the interdependence is a foundation of new institutional approach to environmental issues. The committee is chaired by the Minister of Environment, with the Cambodian Prime Minister as an honorary chair. Its members hold senior positions, e.g. the secretary of state of participating ministries. A climate change technical team (CCTT) was established as a technical body for this high-level committee composing of representatives from NCCC-participating organisations.

Updated in 2014, the ministries that participate in the NCCC are the Ministries of Environment; Agriculture, Forestry and Fisheries; Industry and Handicraft; Mines and Energy; Water Resources and Meteorology; Commerce; Interior; Economy and Finance; Public Works and Transport; Planning; Foreign Affairs and International Cooperation; Education, Youth and Sports; Health; Land Management, Urban Planning and Construction; Rural Development; Women Affairs; and Information. The Council of Ministers, the Council for Development of Cambodia, the National Committee for Disaster Management and the Cambodian National Mekong Committee are also members of the NCCC (Royal Government of Cambodia, 2014a) .

Figure 2.1 presents the formal climate change institutions in Cambodia according primarily to the given roles and responsibilities of the CCD and NCCC as stated in Sub-decree No. 175 (Royal Government of Cambodia, 2009c), Sub-decree No. 35 (Royal Government of Cambodia, 2006c) and Declaration No. 47 of the Ministry of Environment (Royal Government of Cambodia, 2010b). The MOE, with the CCD as a specialised department, plays a central role in relation to the UNFCCC. As a focal point of the UNFCCC and the IPCC, the CCD may have developed cooperation with many international and regional institutions, considering that effective international institutions are important as a complement to the local ones in addressing global environmental problems such as climate change (Pretty, 2003). At the national level, the CCD works closely with line ministries via the members of NCCC and CCTT.

The CCD is also mandated to mobilise financial resources to implement climate change policies, strategies and action plans. As a result, the Cambodian Climate Change Trust

Fund has been developed. In this respect, the CCD connects with funding agencies, UN agencies, civil society organisations and the private sector. For instance, the Trust Fund was supported by the Swedish International Development Agency, the Danish International Development Agency, the European Union, and UNDP with funding amount of about US \$9 million during its pilot phase from 2010 to 2012 (CCD, 2012). However, some funding agencies, e.g. the WB and ADB, also execute adaptation funds by themselves. It is worth noting here that Cambodia has been selected as a recipient country for the Pilot Program for Climate Resilience with funding amount of approximately US \$400 million, of which 12 per cent are grants (Royal Government of Cambodia, 2012). The Pilot Program for Climate Resilience has been executed by the WB and ADB in partnership with relevant government ministries, particularly MAFF and MOWRAM.

Additionally, in order to meet the mandate to facilitate the carbon accounting arrangements in relation to the implementation of the clean development mechanism in the country, the CCD works with the private sector in addition to the relevant government and non-government organisations. However, the partnership with the private sector so far seems restricted to climate change mitigation only.

2.3 Data Collection and Analysis

The data collection process involved conducting interviews with relevant participants (see Section 1.6). The interview questions relevant for this study component include questions number 27, 28, 29, 31, 32, and 39 in the Appendix B. After the interviews were completed, the interview notes and key observations were reviewed and summarised using the interview guide and translated into English. Aspects of the digitally recorded interviews were transcribed where taken notes were not fully completed. The interview summaries were sent by email to the respondents for feedback and confirmation of accuracy. Generally the respondents agreed with the summaries, and answered additional questions if requested. After amendments were made where necessary, the interview information was analysed using the NVivo software program (version 10).

The information was firstly autocoded according to the questions set in the interview guide. The coding of subthemes was done according to what emerged from the interviews and was organised according to the themes identified by relevant literature. For instance, the studies found that issues of institutions and governance (Adger et al., 2005; Lebel et al., 2006; Nelson et al., 2007), institutional capacity (Käkönen et al., 2014; Willems, 2004) and mainstreaming (Dubois et al., 2011; Huq et al., 2004; Smit & Wandel, 2006) are key factors for adaptation. Based on these themes, the information was coded accordingly. However, respondents' thoughts and perceptions in terms of the local actors and possible CCA institutional arrangements are the beneficial implications of this research for climate-informed policy development in Cambodia.

The findings were reported as collective ideas unless variations among different groups of stakeholders (for example, government versus DPs versus academic institutions) persisted. The patterns of some attributes were presented quantitatively and substantiated by pertinent narrative views. The findings were the basis for discussion complemented by the author's professional, social and cultural experiences in and about the country. Archival and literature studies were undertaken to support the discussion.

2.4 Results

The results are presented in three sections. The first section presents stakeholders' opinions in term of 'level of importance' for Cambodia's water resources and agriculture sectors practicing climate-informed planning. The second section identifies the challenges that stakeholders anticipated if the sectors practice such planning. The final section presents ways to address the anticipated challenges.

2.4.1 Stakeholders 'Perspectives on Climate-Informed Planning for Cambodia's Water Resources and Agriculture Sectors

Research respondents shared different opinions in term of 'level of importance' for the Cambodian water resources and agriculture sectors practicing climate-informed

planning (Figure 2.2). The majority of the respondents (from all groups of stakeholders) said they thought that it was very important for Cambodia’s water resources and agriculture sectors to practice climate-informed planning. Many of the respondents explained that it is very important because Cambodia is an agrarian country and most rice plantations are rain-fed. One DP respondent stated that, “with more climate extremes and vulnerabilities, we [Cambodia] need more planning for it.” Another respondent agreed with this, saying, “I think conventional planning is not enough - we [Cambodia] need to consider climate risks in our development.” One DP respondent suggested having area-based (e.g. watershed) development plans in the context of climate change and explained that this is important because climate change impacts differ from one region to another.

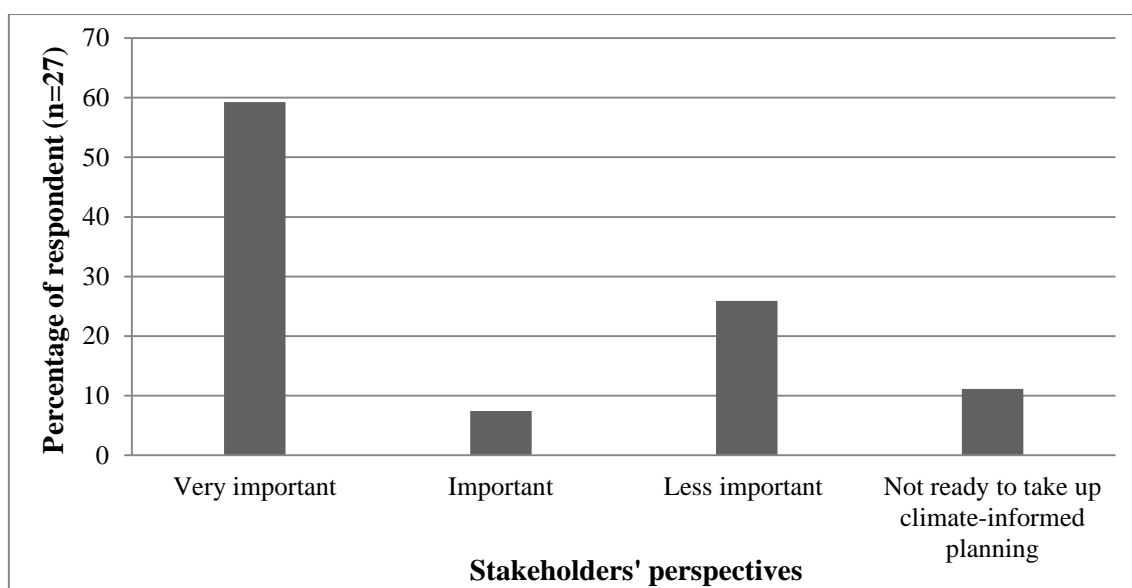


Figure 2.2 Stakeholders’ perspectives on climate-informed planning for Cambodian water resources and agriculture sectors

In term of reasons for practicing climate-informed planning, most of the respondents from the fisheries sector observed that climate change has impacted fish stock. One respondent stated, “farmers have recently had instances of insufficient water in fish ponds, and I think it is an impact of climate change.” A few respondents mentioned that climate change has threatened Cambodia’s food security and one government respondent stated, “it is very important to take climate change into consideration

because it relates to food security, especially rice. Rice production shares 50 per cent of total agriculture gross domestic product, which is about 30 per cent of the national gross domestic product.” Two respondents mentioned the impacts of climate-related disasters on infrastructure as a key reason they understood the importance of climate-informed planning.

About one-third of the respondents (from all groups of stakeholders) thought that climate change is not a priority issue for Cambodia, explaining that climate change is a long-term process, therefore it takes a long time for its impacts to be realised. One academic institutions respondent understood climate change as a natural process that has happened for hundreds of years, thus it should not be given any special attention. Another respondent also argued, “climate change is not a high priority; food security is more important.” Another respondent supported this, saying, “...Cambodia should give high priority to poverty issue.” Two government respondents mentioned that given the availability of climate change funds, climate change is a political issue. One of them stated, “climate change is not a priority; the availability of climate change funding is a driver.” The arguments suggest that the respondents lacked understanding of climate change and its impacts and vulnerabilities. It is certainly true that climate change negatively impacts food security as well as other sectors, which in turn exacerbates poverty in Cambodia.

Three respondents argued that Cambodia is not ready to take up climate-informed planning due to the limited understanding of climate change issues. One academic institutions respondent argued, “I think the introduction of climate-informed planning will create more confusion because planning for climate change involves high uncertainty, while stakeholders’ understanding of the issues is limited.” The respondents implied that additional investment is needed for developing climate-proof infrastructure and given the lack of expertise with that type of designing in Cambodia, it is likely that it will be just a waste of resources, especially funding. Another DP respondent agreed with this saying, “there is uncertainty in climate change, thus it may be safer to just improve quality of development projects.” The arguments are feasibly relevant to infrastructure development. However, for agriculture there are many no-

regret adaptation options that should be considered, for example changing cropping calendar or changing crop varieties to suit local climate conditions.

2.4.2 Challenges for Climate-Informed Planning in Cambodia's Water Resources and Agriculture Sectors

The research respondents anticipated a number of challenges for the Cambodian water resources and agriculture sectors if they adopted climate-informed planning. Key challenges mentioned include lack of relevant information, lack of CCA expertise and understanding, weak CCA governance and institutions, and lack of funding (Table 2.1).

Table 2.1 Challenges for practicing climate-informed planning

Challenges	Number of Respondents	Percentage of Respondents (n=29)
Lack of relevant information	19	66
Lack of expertise and understanding	18	62
Weak governance and institutions	17	59
Lack of financial resources	15	52

Climate change-related information

About two-thirds of the respondents indicated the lack of relevant and accurate information as one of the key challenges for CCA work in Cambodia. One DP respondent argued that in order to practice climate-informed planning, Cambodia needs a great deal of quality information which is not available at the moment. Another DP respondent agreed with this, saying, “the availability of historical climate information is very limited, and I am not sure if it is reliable.” The respondents also commented that the available information is very general and lacks specific policy recommendations. One DP respondent explained that climate change vulnerabilities and responses are different from one region to another, therefore location-specific climate conditions, vulnerabilities and adaptations need to be accurately mapped out.

In order to apply climate-informed planning, the respondents indicated a requirement for following climate-related information: climate change impacts and vulnerabilities; climate change projections; historical climate data; and adaptation technologies and good practices (Table 2.2). Regarding information on climate change impacts and vulnerabilities, half of the respondents indicated a need for location-specific information (e.g. local climate hazards and vulnerabilities). Slightly more than half of the respondents thought that climate change projection (e.g. rainfalls, temperatures, floods and droughts) is necessary for climate-informed planning. Historical climatic data that was mentioned by the respondents included climate-induced disasters, precipitations, temperatures and humidity. Nearly half of the respondents indicated a need for information on adaptation technologies and good practices (locally and internationally) which include community's adaptation practices, rice varieties that are tolerant to local climate conditions, a cropping calendar, and water demand and water use efficiency.

Table 2.2 Stakeholders' opinions on information for climate-informed planning

Relevant information	Number of respondents	Percentage of respondents (n=26)
Climate change impacts and vulnerabilities	16	62
Climate-related projections	14	54
Historical climate conditions	11	42
Adaptation technologies and good practices	11	42
Others	9	35

CCA Expertise and Understanding

Some 60 per cent of the respondents indicated 'lack of expertise and understanding' for personnel working on CCA as one of the key challenges for practicing climate-informed planning in Cambodia. Many government officials admitted that they had limited understanding about climate change and adaptation. One government respondent stated, "our understanding on the concepts relating to climate change and adaptation is inadequate." Another respondent said, "we [government ministries] lack expertise, especially in the field of climate change adaptation." There were similar confirmations from the DP and academic institutions respondents. One DP respondent also mentioned,

“although we [DP officials] are involved in some climate change-related activities such as the National Climate Change Forums, our understanding about adaptation concepts remains incomplete.”

A lack of understanding on how to mainstream climate change and adaptation into sectoral development plans and projects was mentioned by a small number of research respondents. One DP respondent stated, “climate change resilient infrastructure development is new for us... what climate change considerations should be included in the irrigation designs? Should we have more spillways or should we increase the safety factor?” Another government official interviewed shared similar challenge, “we [Fisheries Administration] have implemented an adaptation pilot project relating to community fisheries development. I challenged with mainstreaming adaptation into community fisheries development plan... I am not sure what climate change considerations should be taken into the plan.” For this reason, one government official argued that although sectoral CCSPs have been developed to facilitate the mainstreaming of climate change into development strategies, it still takes time to be able to operationalise it.

The issue of the lack of CCA expertise and understanding within government ministries is believed to relate to the lack of motivation of government officials due to low government salaries and a lack of incentive for them to work for CCA. The respondents thought that an incentive for CCA work should be considered, especially for the members of NCCC and CCTT. One academic institutions interviewee said, “because climate change is additional work for members of NCCC and CCTT, thus appropriate incentive should be provided to them.” Another government respondent also shared a similar thought, saying that, “we [the event organisers] invited members of CCTT for meetings, seminars and dialogues. We felt hesitant to invite them because we haven’t provided them any incentive (e.g. daily supplementary allowance).” Another DP respondent further argued that, due to the lack of incentives, government officials were even discouraged to learn new knowledge, such as climate change.

CCA Institutions and Governance

Slightly more than half of the respondents identified governance and institutional issues as one of the key challenges in CCA work in Cambodia. About two-thirds of the respondents mentioned ‘poor cooperation and coordination among CCA stakeholders’, while the rest pointed to the lack of political will and lack of organisational mandates on climate change. One DP respondent commented that, “the Cambodian National Program of Action for Climate Change was completed in 2006; however, there has been lack of commitments and efforts for it.” The respondent further observed that although climate change has recently been articulated more in national strategic development plan (2009–2013), there is no clear direction of what will be implemented.

The majority of respondents, especially those from government ministries, were not completely aware of existing climate change institutions. Only a few respondents from MAFF and MOWAM reported having been involved in or aware of their sectoral CCSP. One DP respondent argued that the development of MAFF’s sectoral CCSP was not done in a participatory manner. The respondent stated, “the questions are: what was the stakeholder’s engagement process in developing the MAFF climate change strategy? Did they engage relevant specialised departments in the process? I am afraid that it was made by a few people whilst many important stakeholders from relevant specialised departments were not even aware of it.” The respondents suggested introducing a more participatory process for CCA work. One of them said, “because climate change is cross-cutting in nature, it is always important to put issues on table for relevant stakeholders.”

The development of sectoral CCSPs was coordinated by the CCD with financial support from the Cambodian Climate Change Trust Fund. In term of process, ‘contracts’ were made between the Cambodian Climate Change Alliance who executed the Climate Change Trust Fund and respective NCCC members on behalf of their ministries. As described by one government official:

As per process, a contract was made to line ministries (nine of them including MAFF and MOWRAM) through NCCC representatives. The respective member of the CCTT of line ministries is a focal point in the

process – where communication between CCD and the ministry takes place. However, whatever arrangement and engagement were employed in the process was solely up to individual ministries.

Another government official explained that by doing this, line ministries will have more ownership of the plans thus they are more likely to be implemented. The respondent further recalled a lesson from the development of NAPA, saying, “because it [NAPA] was developed by MOE, many stakeholders misunderstood that it belongs to MOE, resulting in a low rate of implementation.”

Financial Issues

About 50 per cent of respondents (with half of them from government ministries) identified the lack of financial support as a challenge in practicing climate-informed planning, explaining that additional budgets will be required for more climate-resilient development. One government official said, “we [government ministries] do not even have sufficient budget to implement the current plans, so it will be very challenging if we practice climate-informed planning.” Similarly, another DP respondent said, “it will be very difficult for infrastructure development since we usually design the infrastructure (e.g. irrigation systems) based on the available budget.” This implies that there was quality discounting for infrastructure development due to budget constraints, thus climate-proof infrastructure development is not possible if no additional budget is made available.

In addition to the lack of money for implementing water resources and agriculture plans and policies, a small number of respondents raised concerns over the issue of uncertainty in seeking external funding supports (overseas development assistance). This concern is relevant given that almost 90 per cent of the budget for implementing development plans comes from external funding sources. One government official said, “we [Fisheries Administration] have developed household fish farms under support from funding agencies, especially the Danish International Development Agency. Recently, the funding Agency withdrew from Cambodia and we were not able to seek other funding to continue supporting the projects resulting in some of them becoming

less functional.” The lack of secured funding support harms the sustainability of projects.

2.4.3 Addressing the Challenges

In order to facilitate the adoption of climate-informed planning in the Cambodian water resources and agriculture sectors, research respondents recommended a number of measures in response to the identified challenges. The recommendations related to good governance and institutions for CCA, CCA expert technologies (capacity-building and information), climate change mainstreaming, and funding sources and mechanisms (Table 2.3).

Table 2.3 Stakeholders’ recommendations for climate-informed planning in Cambodia’s water resources and agriculture sectors

Suggestions	Number of Respondents	Percentage of Respondents (n=28)
Relevant information	18	64
Good governance and institutions	18	64
CCA mainstreaming	16	57
Funding sources and mechanisms	12	43
Capacity building	12	43

Relevant Information for Climate-Informed Planning

In response to the lack of relevant information for climate-informed planning, the majority of the respondents proposed a number of measures including conducting studies and looking for information from relevant local organisations and studies (Figure 2.3). One respondent indicated there is a need to conduct climate change vulnerability assessment on a community scale, saying that “climate change adaptation policies development should take into account location-specific climate hazards, vulnerabilities and adaptation – these issues can be informed by local vulnerability assessments.”

Along this line, the respondents also reported some works underway regarding information-generation tools. The Cambodian Development Resources Institute was reported to be conducting a review on climate change vulnerability assessment methods as part of its CCA project. Another DP respondent reported a similar tool, the vulnerability reduction assessment (VRA) that was developed by the Small Grant Program of the UNDP. The VRA has been applied by a number of NGOs working for community-based adaptation program of the UNDP and in two adaptation projects – the Climate Resilient Water Management and Agricultural Practices in Rural Cambodia (NAPA-Follow Up or NAPA-FU) and Local Government and Climate Change (LGCC) – to facilitate climate-informed local development planning. The VRA is a tool that collects communities’ knowledge and perceptions about local climate change, especially climate extremes such as floods, droughts and windstorms (see Chapter 4 for more discussion).

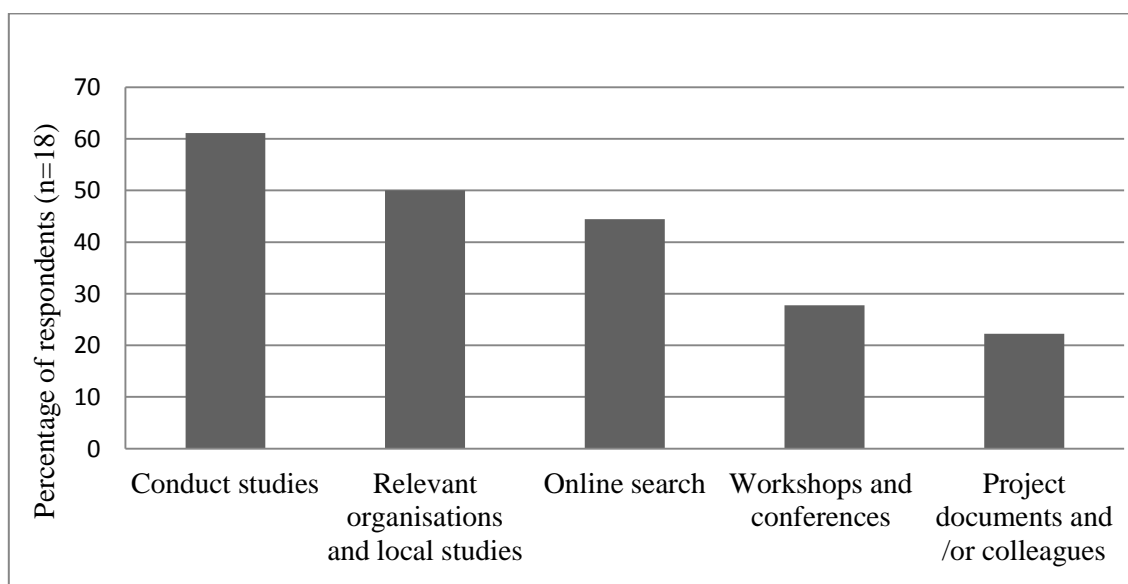


Figure 2.3 Sources of relevant information for climate-informed planning

Good Governance and Institutions

About two-thirds of the respondents identified ‘good CCA governance and institutions’ as a factor facilitating climate-informed planning. More collaboration between MOE,

the foci of the UNFCCC and climate change resources, and line ministries was called for, and so was collaboration between climate change foci within line ministries and their relevant departments. One government respondent mentioned, “more collaboration either between MOE [referring to CCD] and Fisheries Administration or between Fisheries Administration’s climate change foci and its relevant departments are needed.” The respondents indicated a lack of CCA-related information and funding shared with relevant departments within line ministries. Four DP respondents on the other hand called for stronger commitments from the government, one of them said, “I think we need a collaboration framework for CCA work... however, CCA work will be effective only if the government ministries commit to it.” Additionally, another respondent stated, “the first National Climate Change Forum with the presence of the Prime Minister attracted a lot of attention from line ministries, but there seemed to be no further actions.”

The majority of the respondents (about 80 per cent) pointed to the need to improve the functions of existing institutions. One academic institutions respondent said, “the existing institutional architecture is good, the important thing is to make them functional.” In order to improve existing climate change institutions, research respondents recommended strengthening the roles and capacity of CCTT members, establishing a climate change focal point for line ministries, and engaging relevant local academic institutions.

Recognising the important role of NCCC and CCTT committees, four respondents from academic institutions and government organisations thought that strengthening the capacity of the committees is of critical importance. One respondent stated, “the CCTT is an important body. If they are competent enough then the CCA institutions should work.” The respondents also suggested providing financial incentives to members of the NCCC and CCTT, explaining this is necessary because climate change related roles are additional responsibilities. The respondents pointed to the need to motivate the committees for productive CCA work in Cambodia.

Four respondents recommended strengthening or establishing climate change working groups for line ministries. One respondent stated, “there should be a climate change unit working closely with a minister; the unit should assist in compiling adaptation good practices and integrating them into sectoral policies, programs and projects.” The respondents implied that the existing climate change committees were less functional and/or there were inadequate personnel for the committees to work effectively. It was noticed that MAFF has its own climate change working group, especially assigned to develop the CCSP.

Taking another approach, three non-academic institutions respondents suggested including local universities in the existing climate change institutions. One DP respondent argued that climate change institutions should include local academic institutions saying, “there should be participations from local academic institutions. In many countries, research institutes play an important role in providing relevant information for policies and strategies development.” In response to this suggestion, one government respondent explained that NCCC is a high-level decision-making body comprised of high-ranking officials from line ministries, which is hierarchically higher than the academic institutions’ organisations. The CCTT was restricted to organisations that participate in the NCCC only.

Some 20 per cent of the respondents, mainly from DPs, suggested that climate change should be coordinated by an organisation that is higher than ministerial level; for example, one respondent suggested the Council of Ministers. Two DP respondents indicated that the roles of MOE in coordination of climate change works were not sufficient. One of them stated, “although CCD is strong it could not represent MOE – it is just like a tree, it cannot represent a forest where it is in.” Another DP respondent agreed with this, explaining that CCD is at the departmental level, thus it may not have sufficient power to facilitate climate change institutions that require cooperation from line ministries. The respondent further observed that the Environment Minister has a weak power relationship with the Cambodian Prime Minister, resulting in ineffective decision-making for CCA. The comments may be less relevant currently, however,

given that MOE has received a new minister during this government mandate (2014-2018).

Mainstreaming Climate Change

Slightly more than half of the respondents suggested mainstreaming climate change into development policies as a means to facilitate climate-informed planning. One DP individual interviewed stated, “we need to mainstream climate change into every sectors and at all levels.” Another government respondent also commented that “the current sectoral development plans lack climate change considerations.” Additionally, another DP respondent argued that many CCA projects in Cambodia were implemented as stand-alone projects that may not be effective in addressing climate change vulnerabilities. The respondent highlighted that they should complement development plans rather than working on their own.

Six respondents noted the ongoing progress in climate change mainstreaming in Cambodia. Some of them have noted that the phrase ‘climate change’ has appeared more in recent national and sectoral development plans (2009–2013). One DP respondent stated, “within sectoral policies, we see the phrase ‘climate change’ appearing more and this may be a good start.” Many of the respondents were aware of the ongoing development of national and sectoral CCSPs and hoped that the strategies will assist line ministries in practicing climate-informed planning. One of the main purposes of a CCSP is to facilitate mainstreaming climate change into development plans. One government respondent confirmed this, saying, “it is intended that the climate change strategies will be integrated into the sectoral and national development plans for 2014–2018.”

Sectoral development plans were suggested by the respondent as an appropriate entrance for mainstreaming climate change. One DP respondent argued, “mainstreaming climate change into sectoral development plans will be more effective than mainstreaming it into the national development plan.” For the fisheries, one government respondent indicated that it is possible to include adaptation measures into the 10-year fisheries strategic framework. The respondent explained that the strategic

framework was designed to have three phases consecutively (2013, 2016 and 2019), thus providing the opportunity to revise according to new emerging opportunities or challenges. One academic institutions respondent, however, argued that the current development plans, which generally run for a period of five years, may be too short for considering climate change impacts.

A small number of respondents advocated the representation and deliberation of CCA knowledge in the process of mainstreaming. The respondents emphasised the need for participation from a wide range of stakeholders in mainstreaming climate change. One DP respondent stated, “mainstreaming cannot be done by simply creating a department or unit of climate change at ministries.” The respondent thought that it is important that specialised departments and offices (e.g. the Department of Rice, Department of Animal Husbandry, and so on) understand climate change impacts on their subsectors, appropriate responses, and the costs of those adaptation technologies. The mainstreaming issues are discussed in more details in Chapter 3 and 4.

One DP respondent pointed to the NAPA-FU project as a good model of mainstreaming climate change wherein a wide range of stakeholders (MAFF, MOWRAM and Women’s Affairs), across multiple scales (national, provincial, district and commune) were engaged in promoting climate-resilient development projects. The respondent also reported that the project used VRA as a local planning tool and encouraged relevant stakeholders to use it more widely. The respondent explained that VRA creates opportunities for relevant stakeholders to work together, thus supporting collective actions, saying that, “through VRA we can get participation of local authorities and farmers of both genders for their local planning.” This model is discussed in more detail in Chapter 4.

Capacity-Building and Awareness-Raising

Some 40 per cent of the respondents thought that more specific CCA capacity-building and awareness-raising are required in order to practice climate-informed planning. One government respondent commented that, “the information we received is very general and is for basic awareness; it is not so useful for our job.” While the respondents

highlighted the importance of capacity-building and awareness-raising, they did not point to any specific areas that were considered necessary for their profession. This may reinforce the earlier finding about their limited understanding of CCA. Two respondents suggested providing training relating to good governance and leadership to government officials, explaining that such knowledge may facilitate more cooperation and coordination in CCA work in Cambodia.

Half of the respondents gave a high priority to building the capacity of members of CCTT. One respondent stated, “the CCTT is an important body. If they are competent enough then the CCA institutions should work.” A government official interviewed reported that the members of CCTT have been given many opportunities for CCA-related capacity-building. Still, the respondent agreed that further capacity-strengthening efforts remained needed for members of CCTT and NCCC.

A small number of respondents, however, argued that CCA-related training was very restricted and was mainly for members of CCTT only, as was CCA-related information-sharing. In response to this, an individual government official interview stated that CCD was able to provide some specific CCA-related training to relevant stakeholders, saying, “the members of NCCC or CCTT can always request CCD for any specific training that they consider important for their organisations.” This suggests the importance of the members of NCCC and CCTT taking a more proactive role in strengthening the CCA-related capacity of their organisations.

Funding Sources and Mechanisms

In response to the lack of funding for climate-informed planning, respondents pointed to different funding sources, which include government budgets, international adaptation resources and the mobilisation of local resources. About half of the respondents (mostly from government organisations) pointed to the adaptation resources as a source for funding climate-informed planning in Cambodia. An individual government official interviewed stated, “there is a need for external funding support for climate change-related works.” One-third of the respondents, also mostly from government ministries,

however, argued that the government should allocate a budget for CCA. Two respondents thought about mobilising local resources for it.

In regards to the adaptation resources, the respondents suggested the need to fairly allocating adaptation resources across all sectors. One DP respondent commented, “climate change resources are concentrated at the MOE; MAFF is not well aware of such opportunities, and even less so for MOWRAM.” Casual conversations with respondents indicated that the majority of government respondents were not aware of the available CCA resources, including the Climate Change Trust Fund that had called for CCA-related applications twice during its pilot phases (2009–2013).

Research respondents stressed that it is important to ensure that the adaptation resources are used efficiently. As one of them noted, “it is critical to make sure that adaptation fund is used to promote adaptation activities.” In term of funding mechanisms, one government respondent recommended that adaptation funds should be used to support specialised departments to implement their respective sectoral CCSP. Another government respondent suggested that the shares of adaptation resources should be channelled through TWGs of relevant sectors. A TWG is a government–donor coordination body that facilitates the implementation of national strategic development plans and aid effectiveness in Cambodia. TWGs are chaired by a key government organisation and facilitated by one of key funding agencies for that respective sector. For instance, the TWG for fisheries is chaired by the Fisheries Administration and facilitated by the European Union.

2.5 Discussion

The majority of respondents recognised the impacts and vulnerabilities of climate change (i.e. on fisheries and infrastructure) and thought that it was very important for Cambodia’s water resources and agriculture sectors to practice climate-informed planning. The respondents anticipated a number of challenges for practicing climate-informed planning, including a lack of relevant information, lack of expertise and understanding, weak CCA governance and institutions and a lack of financial resources.

These issues are interconnected (Smit & Wandel, 2006) and need to be addressed collectively. The respondents also suggested a number of proposals in response to these challenges that should be considered for CCA development in Cambodia. This discussion is divided into two sections: issues relating to institutions and governance and the issue of information and capacity building.

2.5.1 Institutions and Governance Issues

The study found that the NCCC and CCTT have important roles in facilitating CCA work and capacity-strengthening in Cambodia. For example, only the climate change committees can request specific CCA-related training from CCD for their organisations. Additionally, according to the process of developing CCSP, members of NCCC and CCTT have important roles and responsibilities in facilitating the development of sectoral CCSPs. These roles are in accordance with their mandates, as NCCC is responsible for facilitating cooperation among line ministries for climate change commitments (Royal Government of Cambodia, 2006c). The Cambodian Prime Minister recently authorised an additional role for the NCCC in facilitating the implementation of the CCSP (Royal Government of Cambodia, 2013b). Therefore, it is likely that productive CCA work and capacity-strengthening in Cambodia relies on the effectiveness of the committees.

There were suggestions that the climate change committees were not very functional. This was clear when the interviews revealed that many of the government respondents were not aware of or engaged in existing CCA institutions, the development of their sectoral CCSP or aware of available adaptation resources. For instance, although the Cambodian Climate Change Trust Fund financed about 20 adaptation projects during its pilot phase, only a few respondents from MAFF and MOWRAM knew about that funding opportunity. Additionally, the majority of the respondents indicated a lack of collaboration among CCA stakeholders.

In response to the abovementioned issues, respondents had two suggestions: more coordination between MOE (especially CCD) and line ministries; and more

collaboration within the ministries, particularly between respective members of climate change committees and specialised and planning departments. The second suggestion is a key issue because within line ministries only the members of the climate change committees are entitled to access CCA resources including information, funding and capacity-building opportunities. Therefore, it is important that the committees maintain fairness when distributing CCA decision-making powers and resources to relevant departments within their organisation. The equity issue is a central concern in CCA governance (Adger et al., 2005; Nelson et al., 2007).

Appropriate collaboration mechanisms for individual line ministries to ensure good sharing of information and adaptation resources should be established. The research respondents suggested that the adaptation funds should be used to support specialised departments to implement their respective sectoral CCSP. Within the fisheries subsector, its TWG is possibly the most suitable coordination platform for CCA work. Observations and interviews suggested there was a strong appreciation of TWG's contributions within the fishery subsector; however, no such feeling was indicated for other water resources and agriculture-related TWGs. Some TWGs functioned well while others did not (Royal Government of Cambodia, 2006a). Therefore, entry points for adaptation resources to line ministries should be further investigated.

Research respondents also suggested that existing climate change institutions should be improved, recommending that relevant local academic institutions be engaged and climate change working groups be established for line ministries. This suggestion is relevant and important because the current climate change institutions lack flexibility and restrict participation from local academic institutions, civil society and the private sector. For example, NCCC are restricted to line ministries only, as are members of CCTT. If Cambodia intends to develop evidence-based planning and policy development, it is necessary to engage local academic institutions in the policy development process (Füssel, 2007; Lemos & Morehouse, 2005; Veraart & Bakker, 2009).

In order to facilitate climate-informed planning, the respondents also suggested mainstreaming climate change into sectoral development policies. The suggestion is in line with adaptation literature (Dubois et al., 2011; Smit & Wandel, 2006). The mainstreaming of climate change into national development plans was limited in the previous government legislature (2009–2013). The slow progress in mainstreaming climate change into development plans in Cambodia may be because of limited stakeholders' understanding; adaptation resources that are fully dependent on international adaptation funds, thus uncertain and restricted; and the complexity of the Cambodian planning system. Stronger commitments, however, have been seen for the current government legislature (2014–2018) via the development of the CCSP (Royal Government of Cambodia, 2013a) and the establishment of 'green development' policy (Royal Government of Cambodia, 2013d). The issues of mainstreaming climate change are discussed more in Chapter 3 and 4.

2.5.2 CCA Related Information and Capacity Building

The issue of the lack of climate-related information for climate-informed planning in Cambodia is not a surprising finding: it is consistent with previous studies (Dany et al., 2014; Mekong River Commission, 2009). Vulnerability assessment is a tool for generating information for adaptation planning (Füssel, 2007; Fussel & Klein, 2006; Smit & Wandel, 2006), and Füssel (2007) argues that the vulnerability assessment is a key for adaptation planning. Given the diversity of adaptation contexts, the assessment should be flexible using multiple methodological approaches in order to produce knowledge for any specific decision (Füssel, 2007; Lemos & Morehouse, 2005). Given that various climate change initiatives have been ongoing in Cambodia, the slow progress in this information generation cannot meet its demands. However, at the time of writing this thesis, Cambodia had recently introduced a few initiatives (e.g. the Cambodian Development Resources Institute undertook a review of the vulnerability assessment methods as part of their climate change project) to improve the understanding of the vulnerability assessment, which may facilitate the generation of more and accurate relevant climate information in the future. Obeng and Agyenim

(2013) further called for CCA-related information and knowledge-sharing among developing countries.

The ‘lack of expertise and understanding on CCA’ for climate-informed planning in Cambodia is an important finding, especially for institutional capacity-strengthening. According to the respondents, stakeholders lacked understanding of CCA in general and concerning mainstreaming climate change and adaptation into sectoral development plans and projects specifically. This finding is supported by the fact that stakeholders did not know details about the knowledge and training that is most relevant and useful for their sectoral planning. To be effective, specific capacity needs assessment should be undertaken to inform target capacity development. Additionally, as CCA mainstreaming efforts are ongoing in Cambodia, the organisations (such as CCD) and funding agencies (e.g. the WB and the ADB) that facilitate the mainstreaming process should pay attention to this capacity gap. As indicated by Willems and Baumert (2003), if the gap between existing capacity and the capacity required for any policy is too big, the implementation of that policy is not possible.

It is, however, interesting to discover that most of government respondents of this study who were department-level planners (director or deputy director of specialised and planning departments) did not suggest any CCA-capacity training for themselves or their relevant officials. Given their important roles in sectoral and national development planning, they should be equipped with the relevant CCA knowledge. Furthermore, almost two-thirds of the respondents indicated the ‘lack of CCA expertise and understanding’ as one of the key challenges for practicing climate-informed planning in Cambodia, but fewer than half of them indicated the need for CCA capacity-building and particularly for members of the CCTT. This finding has two implications, which are discussed below.

Firstly, it suggests that stakeholders, especially government officials, lack motivation for CCA work and even learning new knowledge such as CCA. This is an important issue that needs to be addressed because effective policy implementation depends on the good performance of individuals (Willems, 2004). Some respondents argued that this

lack of motivation was due to low government salaries and poor incentive for officials to work on CCA. They therefore suggested that financial incentives should be provided to the members of climate change committees, because these climate change related roles are additional responsibilities. These suggestions should be considered, given the importance of these roles in CCA work in Cambodia. This argument is supported by a number of studies (cf. Jutting, 2003; Pretty & Ward, 2001) that also argue that incentives can influence the behaviour of actors.

Secondly, it suggests stakeholders may misunderstand the role of climate change committees as central for CCA knowledge without carefully thinking about how the committees would assist them or in what ways they can make use of the CCA knowledge and expertise for their planning. Moreover, it also implies that the stakeholders lack understanding about adaptation that requires climate-relevant capacity (e.g. knowledge about agriculture technologies that suit local climate conditions) in order to implement it (Willems & Baumert, 2003). The analysis is supported by a few respondents who mentioned that their organisations did not have mandates relating to climate change. In response to this issue, a small number of respondents suggested there should be more engagement of relevant officials in CCA-related works, emphasising that only a restricted number of stakeholders were engaged in the process of developing the CCSP.

2.6 Conclusion

Given the importance of planning for climate change and the availability of international support to assist Cambodia with this process, Cambodia has started to develop climate-informed planning, especially through mainstreaming climate change into development policies and the implementation of adaptation programs and projects. The research respondents identified a number of challenges in this process, most of which are related to the issues of governance, institutional arrangement and institutional capacity that require improvement in order to effectively facilitate climate change mainstreaming efforts. As indicated by a number of studies (cf. Adger et al., 2005; Lebel, 2014; Nelson et al., 2007), institutions and governance have important roles in

planning for climate change. To meet the challenges identified in this chapter, the respondents proposed some solutions, which are worth considering.

The respondents suggested that improving the functions of climate change committees is critical for climate change work in Cambodia, while engaging local academic institutions is essential to facilitate the production and application of climate related scientific information. Furthermore, to enable the practice of climate-informed planning, Cambodia requires intensive capacity development, both in climate-specific and climate-relevant capacities (Willems, 2004). In order to strengthen local capacity, including scientific capacity, technical support from international partners is essential. As Pretty (2003) indicates, effective international institutions are important as a complement to the local ones in addressing global environmental problems such as climate change. To effectively build local capacity, it is important to acknowledge the gaps between local and international experts, i.e. in levels and areas of expertise. However, without appropriate incentive systems established, both capacity-building and climate change adaptation commitments in Cambodia are less likely to be effective.

Although there are a number of challenges that need to be addressed, there have been some positive changes, especially the sharing of adaptation resources among relevant government ministries. For instance, the development of the National Adaptation Program for Climate Change in 2006 was entirely managed by the MOE, while the recent development of Climate Change Strategic Plans were organised through ‘contracts’, wherein line ministries were funded to develop their own climate change strategy. Similarly, during its pilot phase the Climate Change Trust Fund that was executed by the Department of Climate Change supported about 20 adaptation projects from government ministries, civil society organisations and local academic institutions. The sharing of adaptation resources fosters cooperation among stakeholders and promoting participation from civil society and the private sector is suggested in order to open a new gate for adaptation resources, especially funding.

In summary, this chapter examines the key challenges and opportunities for Cambodia to practice climate-informed development planning with a prime focus on improving

existing climate change institutions and governance processes – one of the key components of the study’s framework. The chapter also identifies the lack of a role for local academic institutions in existing climate change institutional arrangements, thus restricting the meaningful integration of climate change concerns into development policies. The chapter also discusses some of the enabling factors, including capacity-building, funding mechanisms and policy frameworks – another key component of the study’s framework.

The following chapter aims to find points of leverage in the Cambodian planning system and where the inclusion of climate change concerns into development policies could be made; that is, to identify potential pathways for strengthening climate-informed development planning in Cambodia.

3. Pathways for Climate-Informed Planning in the Cambodian Water Resources and Agriculture Sectors

3.1 Introduction

There is wide recognition that climate change adaptation should be integrated with national development to enable coherence and synergy with the sustainable development of a country (Adger et al., 2007; Butler et al., 2014; Huq & Ayers, 2008). This is because CCA is connected to local cultural, environmental, political, economic and development contexts (Butler et al., 2014; UNFCCC, 2006). Furthermore, CCA is a continuous process (Adger et al., 2007; Adger et al., 2005; Nelson et al., 2007), thus it makes sense to integrate it into development planning to avoid duplication, fragmentation and conflicts (Ayers, Huq, Faisal, et al., 2014; Lebel et al., 2012). Also, evidence suggests that adaptation projects mainly focus on immediate benefits and are therefore ineffective at addressing the underlying causes of persistent vulnerability (Nelson et al., 2007; Ribot, 2014). This is because adaptation projects tend to focus on meeting objectives or producing outcomes, rather than sustaining a process that builds the adaptive capacity of a vulnerable system; (Adger et al., 2005). Barnett and O'Neill (2010) argue that failing to incorporate adaptation into development can result in maladaptation, while Dubois et al. (2011) view adaptation as part of a comprehensive planning process.

The harmonisation between adaptation projects and development is referred to as 'climate proofing' by some experts (cf. Asian Development Bank, 2005; Veraart & Bakker, 2009) and 'mainstreaming climate change' by others (cf. Ayers, Huq, Faisal, et al., 2014; Huq et al., 2004; Smit & Wandel, 2006). Climate-proofing policies are formulated using climate change impact or technology-based approaches, wherein projected future climatic impacts are used directly to guide development decision-making, such as planning the heights of road or dyke infrastructure, or deciding whether to use flood-tolerant crop varieties for projected flood-prone areas (Ayers, Huq, Faisal, et al., 2014). With climate proofing, it has been advocated that ideally decisions should be based on the 'Precautionary Principle' (Veraart & Bakker, 2009). Some contributions

to the literature (e.g. Butler et al., 2014; UNFCCC, 2006), however, suggest that planning for adaptation should take into consideration non-climatic factors reflecting the social vulnerability of a system (Brooks, 2003), while others (e.g. Käkönen et al., 2014; UNFCCC, 2006) also point to need to consider local technological feasibility.

Mainstreaming climate change, however, is more holistic than climate proofing, as it is based on the principle of reducing vulnerability (Ayers, Huq, Faisal, et al., 2014) and thus does not focus only on impacts of climate change (Brooks, 2003; Fussel, 2005). Mainstreaming climate change aims to integrate climate change concerns into the policies and strategies that address existing problems, so they are tackled synergistically. For instance, a case study of the Nusa Tenggara Barat Province in eastern Indonesia indicated that climate change was just one of 20 causes of community vulnerability (Butler et al., 2014). Therefore, adaptation is more effective when it simultaneously deals with other vulnerability-contributing factors and, in most cases, adaptation projects rarely address climate-induced vulnerability alone (Adger et al., 2007; Butler et al., 2014; Smit & Wandel, 2006). Lebel et al. (2012), however, argue that climate risks that are independent of other factors should be addressed as separate adaptation projects.

Ayers et al. (2014, p. 41) propose that “mainstreaming climate change should result in the informed inclusions of relevant climate vulnerability concerns into decisions and institutions that drive national, sectoral and local development policy, rules, plans, investment and actions.” Similarly, Fussel (2007) argues that adaptation requires attention and action from development stakeholders, who have not taken climate change vulnerability into account in their past decisions. Many contributors to the literature state that planning for climate change requires participatory approaches (cf. Butler et al., 2014; Daniell et al., 2011; Wise et al., 2014) to support social learning and lead to the co-production of knowledge (Armitage et al., 2011; Preston et al., 2013). In practice, mainstreaming climate change faces many challenges, which include a lack of mechanisms for policy coordination, a lack of qualified staff, adaptation initiatives existing as *ad hoc* interventions, uncertainties relating to funding availability and timing, and a lack of local climate impacts information for decision-making (Ayers, Huq, Wright, et al., 2014).

Huq and Ayers (2008) developed a linear four-step process for mainstreaming climate change. The first step involves raising awareness of climate change with stakeholders from government and NGOs, including the private sector, and building scientific capacity. This aims to highlight the relevance of climate change to national and local development pathways and processes, addressing the root causes of vulnerability by learning from past experience. Willems and Baumert (2003) identify two types of capacities that are required for addressing climate change issues: climate-specific capacity and climate-relevant capacity. Climate specific capacity is capacity that is specifically devoted to climate change issues, while climate-relevant capacity supports the vast number of actions that may help to adapt to or mitigate climate change (Willems & Baumert, 2003) such as those for agriculture and water resources management. The second step is to target scientific information to meet the needs of different stakeholders.

Relevant climate-related information for decision-makers includes historical and recent climate impacts, vulnerable systems and their geographic distributions (Carter et al., 2007; Dubois et al., 2011); future potential impacts under projected climate change (Butler et al., 2013; Lobell et al., 2008); and potential alarming impacts (Carter et al., 2007). Researchers (e.g. Adger et al., 2007; Lobell et al., 2008; Smit & Wandel, 2006) have indicated the importance of cost–benefit analysis of adaptation options. An analysis of opportunities related to climate change is also necessary (Carter et al., 2007). The third step is to pilot activities on adaptation and mitigation, again involving stakeholders from government and NGOs, including the private sector. The final step is a full integration of climate concerns into development planning, meaning shifting from ‘business as usual planning’ to ‘planning that takes in climate change concerns’ (Huq & Ayers, 2008).

Within the framework, it is expected that stakeholders will build their capacity through learning by doing, and that will facilitate them to move forward (Ayers, Huq, Wright, et al., 2014; Huq & Ayers, 2008). However, this will not easily happen without engaging multi- and interdisciplinary actors (Füssel, 2007; Lemos & Morehouse, 2005; Veraart &

Bakker, 2009), as well as good governance and institutional process (Lebel, 2014). Practical solutions need to be demonstrated to enhance the probability of taking climate-related research results into policy development (Ayers, Huq, Faisal, et al., 2014; Jones et al., 2009). Approaches that facilitate the use of research results and social learning include the co-production of knowledge (Lemos & Morehouse, 2005; Preston et al., 2013), the use of knowledge intermediaries (Dobbins et al., 2009; Meyer, 2010), and science–stakeholder (Fussler & Klein, 2006; Welp, Vega-Leinert, Stoll-Kleemann, & Jaeger, 2006).

An investigation of mainstreaming climate change in Bangladesh shows that it is far more complicated than the a four-step framework developed by Hug and Ayers in 2008 and is not a linear process (Ayers, Huq, Wright, et al., 2014). Mainstreaming climate change combines a diversity of activities and processes in parallel, and requires involvement from governmental and non-governmental stakeholders as well as scientific communities (Ayers, Huq, Faisal, et al., 2014; Veraart & Bakker, 2009). Mainstreaming climate change also depends on strong political commitment and is impacted by turbulence in political systems, for instance, frequent changes in the ruling political party (Ayers, Huq, Wright, et al., 2014). The case study in Bangladesh also suggest that mainstreaming climate change should focus on national and subnational level institutions and processes, because mainstreaming climate change will be effective only if demand comes from domestic policy stakeholders (Ayers, Huq, Wright, et al., 2014). The focus of this study is at the national planning and institutional levels.

Empirical research on how the harmonisation between adaptation and development can be realised in developing countries remains limited (Butler et al., 2014; Huq & Ayers, 2008). Ayers et al. (2014) argue that mainstreaming climate change can be interpreted differently and there is no single best way of doing it in practice. Ayers et al. (2014) further indicate there is a need for more research on ‘conditions in different contexts’, particularly what factors facilitate effective mainstreaming. Furthermore, Lebel et al. (2012) emphasise that mainstreaming adaptation is influenced by institutional contexts, and that more critical analysis of current planning practices is needed in order to identify appropriate entry points.

Building on the climate change mainstreaming research arguments and experiences recounted above, this chapter aims to contribute new empirical evidence from experiences with mainstreaming climate change in Cambodia. Ultimately, the aim of the chapter is to find points of leverage in the Cambodian planning system where the inclusion of climate change concerns into development policies could be made; that is, to identify potential pathways for strengthening climate-informed development planning in Cambodia. The water resources and agriculture sectors were selected as cases for the study. To this end, this chapter first reviews the major climate change strategies undertaken to date in Cambodia, and then evaluates the attention to integration and mainstreaming in associated key policy documents. The chapter then proceeds to explore in more detail actual experiences in development planning through an analysis of the reflections of key actors involved in planning in Cambodia and other individuals who have an understanding of the country's planning system.

3.2 Data Collection and Analysis

The data collection process involved conducting interviews with relevant participants (see Section 1.6). The interview questions relevant for this study component include questions number 16 to 22 in the Appendix B. After the interviews were completed, the interview notes and key observations were reviewed and summarised using the interview guide and translated into English. Aspects of the digitally recorded interviews were transcribed where notes taken were not complete. The interview summaries were sent by email to the respondents for feedback and confirmation of their accuracy. Generally, the respondents agreed with the summaries, and answered additional questions if requested. Amendments were made where necessary. Once the interview documentation was finalised, the English versions of the summaries were analysed using NVivo software (version 10).

In addition to the interview data collected, a review of policy documents that had relevance to the issues mainstreaming climate change in Cambodia was conducted. These documents were the sectoral CCSPs for MAFF and MOWRAM and the National Development Strategic Plans (NSDP) covering two periods of government, 2009–2013 and 2014–2018. The review of CCSPs was done manually, because the MAFF's CCSP

was in the local Khmer language, while MOWRAM's CCSP was in English. The review of the two versions of NSDP was done with the facilitation of the NVivo software program, essentially through content analysis (text search queries) using the keywords 'climate change' and 'climate change adaptation'.

One of the limitations of this study component was that the development of the NSDP 2014 to 2018 and the CCSPs were in the initial draft stages at the time of the research. Accordingly, the national planning process was mainly examined in relation to the implementation and outcomes of the NSDP 2009 to 2013.

3.3 Climate Change Strategies and Mainstreaming

Cambodia, as one of the most climate vulnerable and least developed countries in South-East Asia, has received climate change funding to assist the country with climate change resilient development. As a result, some initiatives have been completed and some are underway. Over the past decade, Cambodia had made a strong effort concerning developing policy frameworks, institutional capacity-building and awareness-raising. For instance, the first climate change project in Cambodia, *The Cambodian Climate Change Enabling Activities Project*, was launched in 1999 and aimed to produce the First National Communication to the UNFCCC while building local climate change related capacity (Royal Government of Cambodia, 2002). Following this, Cambodia's NAPA was completed in 2006 (Royal Government of Cambodia, 2006b). These have prepared Cambodia for mainstreaming climate change.

Cambodia's strategies on climate change for the decade 2009–2018 (covering the two periods of government: 2009–2013 and 2014–2018) are broader than those of the decade it follows. For both periods, the strategies include strengthening climate change related capacity, developing climate change policy frameworks, promoting the implementation of adaptation strategies, raising public awareness about climate change, and mobilising resources for implementing climate change related policies (Royal Government of Cambodia, 2010c, 2014b). The strategies also commit to greenhouse gas emissions reduction (mitigation); however, this issue is beyond the scope of this chapter.

The strategies are designed to facilitate mainstreaming climate change in Cambodia, in a process that is broadly similar to the practices observed for Bangladesh mentioned previously (Ayers, Huq, Wright, et al., 2014). Details of the strategies are presented in Table 3.1 and they were prepared as responsibilities of the MOE, the Designated National Authority or focal ministry in Cambodia for the UNFCCC.

Table 3.1 Climate change strategies incorporated into the 2009–2013 and 2014–2018 Cambodian NSDPs

Commitments for 2009–2013	Commitments for 2014–2018
Institutional capacity-strengthening	
Strengthen the capacity of the CCD to enable the department to meet its mandates as a secretariat of the National Committee on climate change and the national focal point of the UNFCCC.	Strengthen the capacity of relevant government agencies/organisations to enable them to mainstream climate change into their development policies. Continue to strengthen the capacity of the CCD to better coordinate interministerial activities effectively, as well as in managing national climate change funds. Promote climate change related studies, including climate change modelling. Develop a knowledge management system for collating and sharing climate change information with relevant stakeholders.
Development of policy framework	
Develop strategic and action planning on climate change . Encourage and facilitate mainstreaming climate change into development policies.	Facilitate mainstreaming of climate change across development sectors. Facilitate the development of a medium to long-term adaptation strategy. Updating climate change institutional arrangements.
Promote the implementation of adaptation strategies	
Update and facilitate further implementation of the NAPA.	Implement the CCSP and the National Policy on Green Development. Implement national monitoring and evaluation systems for climate change projects.
Climate change awareness-raising	
Raise public awareness about climate change.	Continue to raise public awareness about climate change at national and local levels.
Resources for climate change commitments	
Mobilise resources and assistance to deal with climate change problems. Develop national climate change fund.	Continue to mobilise resources, including technical assistance for implementing CCSP, and promoting climate change related research. Develop climate change funding mechanisms.

Sources: (Royal Government of Cambodia, 2010c, 2014b)

3.3.1 Tools and Processes Used in Mainstreaming Climate Change

Cambodia developed its National CCSP (Royal Government of Cambodia, 2013a) in order to facilitate the mainstreaming of climate change in national development planning. With financial support from the Cambodian Climate Change Trust Fund, nine line ministries, including MAFF and MOWRAM, recently completed their ministry's CCSPs. The CCSPs from the participating line ministries were the foundation of the National CCSP. The effort was coordinated by Cambodia's Climate Change Alliance, which sits within the MOE. The CCSP also aims to inform overseas development assistance in Cambodia for climate-resilient development (Am et al., 2013; Royal Government of Cambodia, 2013a).

The MAFF's CCSP analysis of the current climate vulnerabilities of Cambodia's agriculture, especially for rice, concludes that increasing temperatures adversely affects agricultural productivity and quality (Royal Government of Cambodia, 2013c). The strategy acknowledges that rice growing is highly sensitive to climate change, because most paddy fields are rain-fed and production is at a household scale. A brief analysis of the climate change vulnerability of other MAFF subsectors, such as animal husbandry and fisheries, is also included in the strategy. With projected increases in mean regional and national rainfall in the rainy season, the strategy acknowledges that Cambodia will suffer more severe floods in the future. The analysis is relevant for agriculture policy stakeholders (i.e. policymakers, planners and practitioners), and provides them with the basis for contextualising the challenges posed by climate change. However, in order to effectively mainstream climate change, more specific analysis should be undertaken. As Dobois et al. (2011) indicate, in order to incorporate climate change vulnerabilities into a planning process, an understanding of the factors and interactions of the factors that contribute to the vulnerabilities, as well as the vulnerable systems, is required.

The proposed adaptations of the MAFF's CCSP for the period 2013–2019 are generally supportive of the continuation of existing MAFF development strategies, for instance, increasing the productivity and diversity of agriculture varieties and promoting integrated pest management programs. For fisheries development, there are programs

promoting aquaculture and improving natural fish stocks, including those at rice fields and post-harvest (Royal Government of Cambodia, 2010e, 2014b). These programs will assist in contributing to the social and ecological adaptive capacity of Cambodia to climate change, provided they are successfully implemented and sustained. In this situation, the proposed adaptations are to fill development deficits, given the fact that most of the proposed development plans for agriculture had low rates of implementation, due to resource constraints. Location and subsystem (e.g. inland fisheries) specific climate change impacts and vulnerability studies are essential to inform the development of these programs toward more climate resilience.

MAFF's CCSP acknowledges there is a weak institutional capacity in general, suggesting capacity should be strengthened in the areas of agriculture technologies and knowledge relating to CCA for agriculture. Researching new agriculture varieties, especially rice varieties that are more climate tolerant, is a key focus of the strategy (Royal Government of Cambodia, 2013c). The research proposals, especially for climate-tolerant rice varieties, are rational (from the perspective of constraint resources available), because while rice is a primary component of the local diet and a planned export produce (Royal Government of Cambodia, 2011b), it has been vulnerable to climate change and climate extremes (Lobell et al., 2008; Royal Government of Cambodia, 2001). These proposals should build on existing research projects.

To date, the Cambodian Agriculture Research and Development Institute has implemented several research projects in partnership with research organisations such as the International Rice Research Institute and the Australian Centre for International Agricultural Research. The International Rice Research Institute has developed rice varieties that tolerate different climate stresses including flood, drought, saltwater intrusion and heat (International Rice Research Institute, n.d). However, the varieties need to be tested and piloted to ensure that they suit Cambodia's climate conditions before their inclusion in agriculture development plans. Other areas for research suggested by Howden et al. (2007) include climate drivers and processes that impact on agriculture, climate risk management, and effective adaptation options including cost-benefit analysis that considers both market and nonmarket values. On the social side,

research is needed on how to improve social acceptance of the newly introduced agriculture adaptation measures (Howden et al., 2007). The UNFCCC (2006) agrees, suggesting that the introduced adaptation measures should be culturally acceptable, socially affordable and environmentally sustainable.

MOWRAM's CCSP defines the impacts of climate change as extreme events, like floods, droughts and windstorms, which may damage water resources management infrastructure. Despite general statements acknowledging that climate change impacts on water resources and socio-ecological systems, the strategy does not include any specific analysis based on scientific evidence, for instance, the extent that climate change has and will impact on any water resource systems or river basins (e.g. the Tonle Sap River Basin) for a given period of time (i.e. the next 10 or 20 years). Such analysis is needed in order to inform the design of water resources management programs, especially water-related infrastructure, to better respond to climate change impacts. Also, given that the Pilot Program on Climate Resilience has allocated a substantial budget for mainstreaming climate change into water resources infrastructure development in Cambodia (Royal Government of Cambodia & Asian Development Bank, 2011), this type of analysis is crucial. One of the reasons for the absence of such analysis could be the lack of expertise within MOWRAM. A few research respondents who were involved in the mainstreaming of climate change under the Pilot Program on Climate Resilience acknowledged that they did not have the appropriate knowledge to do it themselves, therefore they expected assistance from international experts. When referring to the designing of irrigation systems, one of the respondents stated, "we may need to adjust safety factors for the infrastructure, but I am not sure how we could come up with optimum safety levels. If we increase them too high it will increase investment costs unnecessarily."

MOWRAM's CCSP acknowledges their weak institutional capacity in general. Their CCSP also discloses that part of the ministry (referring to the Department of Meteorology) still cannot provide the public with accurate and timely early warning information on severe weather, because there is a lack of expertise and weather monitoring stations throughout the country. The existing meteorological services do aim

to provide the public with weather forecasts for up to seven days and early warning information for extreme events such as floods and storms. The representative of the Department of Meteorology also reported that a seasonal weather forecast system for informing the agricultural cropping calendar had recently been launched, though it was still in the early development stage. In response to these challenges, MOWRAM aims to continue to develop their capacity in terms of expertise and infrastructure; for instance, the ministry plans to install three new weather monitoring stations and upgrade five existing stations between 2014 and 2018. Aligning with the MOWRAM development strategy, MOWRAM's CCSP supports the development of water resources management and flood control infrastructure, farmer water user committees, and meteorological and hydrological monitoring. These are core components of MOWRAM's strategic development plan.

The inclusion of climate change concerns into the Cambodian NSDP for 2014–2018 was arranged through the development of CCSP and was undertaken using two approaches. The first was via the development of each ministry's CCSP. It was expected that as line ministries developed their own CCSP, they would assume ownership of the climate change policies, compared to the NAPA that was completed by the MOE. The implication of this expectation is that line ministries would incorporate their CCSP into their current development policies, strategies and plans. However, only a few department-planners confirmed that they were aware of or involved in the development of the CCSP. At MAFF, a CCSP working group was officially formed to develop the MAFF's CCSP, while at MOWRAM, work was done by an informal CCSP working group, with assistance from a local consultant. Possibly, these approaches were adopted because the development of each ministry's CCSP was arranged through 'contracts' between the Cambodia's Climate Change Alliance and the respective NCCC's members of line ministries. Secondly, officials of the Cambodia's Climate Change Alliance participated in the process of developing the current NSDP via a number of workshops, meetings and consultations and tried to impress on the NSDP's stakeholders the importance of the national CCSP, to increase the likelihood of incorporating CCSP aspects into the NSDP. According to the mainstreaming processes, it is suggested that the inclusion of climate change into Cambodian policy remained

strongly dependant on the Cambodia's Climate Change Alliance. However, stronger commitment from line ministries is crucial to effectively mainstream climate change into their development plans.

3.3.2 Progress in Mainstreaming Climate Change in Cambodia

In the last NSDP, 'climate change' was framed as one of the main issues that threatened Cambodia's economy and prosperity in general terms. For instance the document includes the statement, "at the present time, the whole world faces unprecedented challenges posed by a series of global crises, that include not only the ongoing global financial crisis and the resulting economic downturn, but also issues related to the impacts of climate change" (Royal Government of Cambodia, 2010c, p. 163). Additionally, page 195 of the policy document also states, "the increased incidences of natural disasters caused by global climate change have serious implications for a small country like Cambodia." In the current NSDP, 'climate change' is articulated in more detail as a key issue for Cambodia. For instance, "global climate change has adversely impacted on Cambodia's ecosystems, thus threatened the socio-economic development of the country" (Royal Government of Cambodia, 2014b, p. 87). Furthermore, the current NSDP acknowledges climate change impacts on various sectors, such as food security, fisheries, health and infrastructure.

As well as the abovementioned climate change issues, a number of climate change strategies were incorporated into the current NSDP. For agriculture, the plan acknowledges the lack of relevant climate change studies for developing effective measures to respond to climate change overall. The plan therefore focuses on CCA research and development directed towards improvements in agriculture land and soil management, farming systems that are more tolerant to climate change, rice and vegetable varieties that can better tolerate flood and droughts and climate change vulnerability assessments on agriculture (i.e. crops, vegetables and fruit trees). Furthermore, the policy also aims to improve the adaptive capacity of farmers by providing them with better agriculture-related services (i.e. strengthening agriculture extension services). Improving disaster preparedness and enhancing communities'

resilience to climate change are also underscored in the current plan. Having admitted that Cambodian fisheries are threatened by external threats, including climate change and hydropower development, the Fisheries Administration indicates there is a need for stronger regional cooperation to address the issues.

Unlike agriculture, water resources management is not outlined as a stand-alone section in the NSDP. Most of the focuses of MOWRAM are listed under the section on ‘infrastructure development’. MOWRAM, during the current plan period (2014–2018), will continue to focus on developing infrastructure for water resources management and upgrading meteorological monitoring stations. The current plan underlines the need to take into consideration climate change impacts, for instance, “... construction of water storage reservoirs and irrigation networks will be done with considerations of climate change” (Royal Government of Cambodia, 2014b, p. 151). Additionally, MOWRAM indicates a strong commitment to participating in regional programs for effective river basin management and for addressing issues of climate change, especially with the Mekong River Commission.

With regard to climate change implementation, Cambodia also made relatively good progress during the previous government planning period from 2009 to 2013 (Royal Government of Cambodia, 2014b). For instance, the Cambodia’s Climate Change Alliance supported 21 adaptation projects during its pilot phase from 2010 onwards. Research respondents from MAFF and MOWRAM also reported some adaptation projects that were implemented by their own organisations. For instance, the Fisheries Administration implemented projects relating to building canal dykes, for the purpose of protecting fish habitats in the Kratie and Kampong Speu provinces. A DP respondent also reported that the ADB had allocated a budget of about US \$14 million, for mainstreaming climate change into Cambodia’s water resources management sector development program as one component of the Pilot Program on Climate Resilience.

3.4 National Development Planning

3.4.1 National Development Plans for Water Resources and Agriculture

According to the research respondents, the national development planning system is comprised of annual activities plans, three-year rolling plans and five-year strategic development plans (referred to as medium-term development plans in this study). Respondents indicated that unachievable or incomplete annual activities were rolled over to subsequent years in three-year rolling plans. The medium-term development plans are the five-year NSDP and ministries' five-year development plans (e.g. MAFF and MOWRAM's five-year development plans). The two versions – the NSDP and the ministries' development plans – were developed in parallel. For instance, the *Strategic Development Plan on Water Resources and Meteorology 2009–2013* was developed in parallel with *The Updated NSDP 2009–2013*.

Some respondents reported that MAFF had discussed developing its long-term development plan (20 years), although the process was reported to be at a very early stage. One MAFF respondent stated, “in order to incorporate with the ongoing development of the government's long-term development vision, the MAFF has also discussed its long-term development plan.” The Department of Horticulture of the General Directorate of Agriculture was also reported having discussed developing its longer-term development plan (2013–2023). The department representative explained, “Cambodia needs to meet the vegetable quality standards of the Association of South-East Asian Nations in order to export local vegetables to the Nations' markets.” For this reason, the department thinks that it is necessary to develop a longer-term development plan for this specific subsector. The initiative was still at an initial stage at the time of this study.

Additionally, there are some other water resources and agriculture policy documents, such as *The Strategy for Agriculture and Water* and *The Strategic Planning Framework for Fisheries: 2010–2019*, which were developed for those sectors. The *ad hoc* plans were reported by respondents to be used to inform or be included in the five-year development plans of MAFF and MOWRAM. For example, *The Strategic Planning Framework for Fisheries* was reported to be used as a guide for the Fisheries Administration stakeholders in planning their ministry's development plans. This study only analysed in detail the national medium-term planning processes, the 2009–2013 NSDP, and the latest five-year development plans of the two ministries.

3.4.2 National Development Planning Processes

According to the respondents, the design of the medium-term development plan, the 2009–2013 NSDP, was generally based on experience and discussions held by relevant officials. SWOT (strengths, weaknesses, opportunities and threats) analysis was reported to be used as a planning tool by many of the respondents. The development of the medium-term plans was based on the *Rectangular Strategy for Growth, Employment, Equity and Efficiency* (known as the Rectangular Strategy) (Royal Government of Cambodia, 2008b). The Rectangular Strategy is grounded in the socioeconomic policy agenda of the Cambodian government. Only two respondents from DPs reported having used some historical climate information for their planning. The climate-related information used was taken from the Proceedings of the Cambodian National Climate Change Forum (National Climate Change Committee, 2009) and citizen knowledge (location-specific climate information collected from communities) that was produced by their organisations. One respondent stated, “historical and existing climate information was generated using local knowledge to inform the design of development programs – the process is called *climate screening tool*.”

The processes of developing the 2009–2013 NSDP as informed by research respondents involved many steps (Figure 3.1), with the GDOP providing a facilitating role. In order to obtain participation from line ministries, the GDOP, on behalf of the Ministry of Planning, officially sent a letter signed by the Prime Minister to them, to inform about the development of the NSDP. A concept note (guidelines), highlighting the general framework for the NSDP, was attached with the initial invitation. The concept note was developed by GDOP according to high-level government policies and strategies, such as the Rectangular Strategy, and in consultation with the Ministry of Planning, the Ministry of Economics and Finance, the Cambodian Development and Rehabilitation Board of the Cambodian Development Councils and the National Supreme Economics Council of the Council of Ministers. According to the concept note, the GDOP then developed a template for collecting relevant information for the planning.

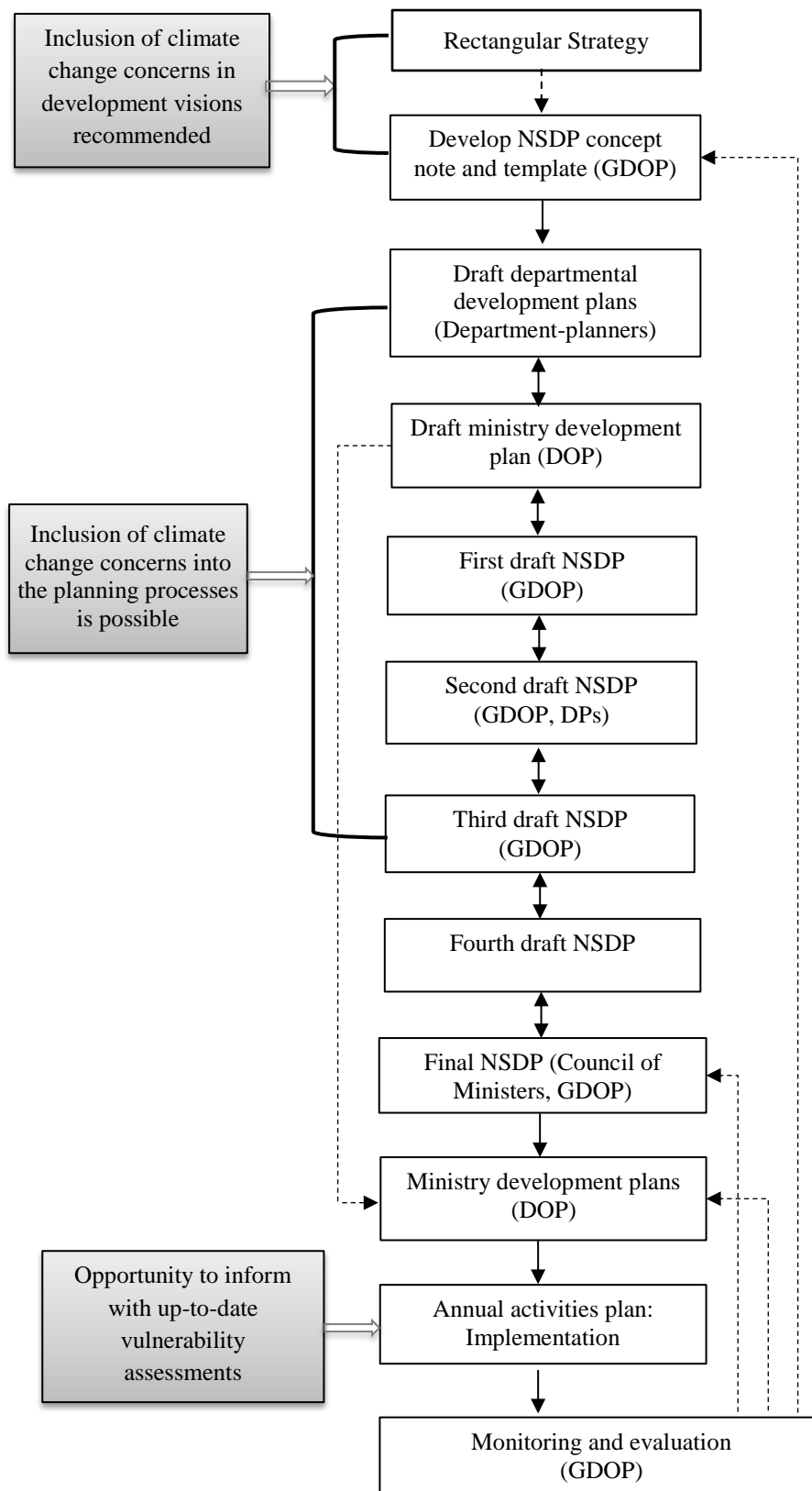


Figure 3.1 2009-2013 National development planning processes and entry points for mainstreaming climate change

Notes: Acronyms in brackets refer to key actors, symmetrical arrows indicate where revisions take place, and shadow boxes are key entry points identified in this study

Source: Author, 2014

In response to requests, each line ministry nominated a planning team to work with the GDOP. The teams were comprised of a team leader, who generally was a secretary or undersecretary of state of their ministry, a director or vice-director of DOP, and a few selected department-planners, who had good knowledge and experience in planning. However, the DOP of line ministries was a focal point of the ministry, an informant from the GDOP clarified, “in the process of developing the 2009–2013 NSDP, we [the GDOP] mainly communicated with line ministries through their DOP.” At the departmental level, informants confirmed that generally, a director or one of the deputy-directors of the department was responsible for planning (referred to as a department-planner here). These suggest that DOP and department-planners are the key actors for integrating climate change concerns into their respective development plans.

To assist the planners with developing their ministry development plans, the GDOP organised a series of seminars for the planning teams and department-planners to explain the planning process and the application of the template. Many MAFF and MOWRAM respondents confirmed that the seminars were very useful in guiding the planning. One respondent from MOWRAM stated, “the seminars provided necessary guidance, especially how to align the Ministry’s development plans with the government’s high-level policies and strategies such as the Rectangular Strategy.” Another respondent from MAFF elaborated on that, saying, “the first seminar aimed to develop visions for the country in the next five years, and the following ones discussed tools for identifying and prioritising constraints and challenges versus responding strategies.”

As the first seminar aimed to build development visions, key actors especially climate change researchers and committee or CCSP working group members should have been engaged in the process, thus helping to frame a more climate resilient development visions. Including those actors will bring in relevant sciences and represent vulnerable communities through their research, thus assisting planners in framing their development goals toward more climate-resilient development. DPs should also be involved in the process, sharing their perspectives and experiences and, having been

engaged in the process, they will be able to better align their development assistance with the national development's visions.

The development of the ministries' development plans was a synthesis of their respective department development plans. The approaches of developing MAFF's and MOWRAM's ministry development plans were slightly different. At MAFF, it was reported that the MAFF's DOP firstly informed department-planners (via their respective division's DOP),⁵ about the development of the medium-term agriculture development plan. In terms of organisation, MAFF's DOP provided the department-planners with a template for facilitating their departmental development plans. The department-planners needed to return the filled-out template to the DOP for collation within a given period of time (generally a few weeks). According to the respondents, it usually took a few rounds of feedback in order to include complete and comprehensive planning information. Many of the department-planners, reported that a few meetings among their officials were organised for their departmental development planning.

At MOWRAM, it was reported that upon completion of the seminar series, a director of DOP reported to the MOWRAM's minister regarding the development of the medium-term development plan and requested a meeting with the department-planners, technical directors general and project implementing units. The planning template was shared during the meeting, so that the necessary information for MOWRAM's plan could be collected. The results of the meeting were then reviewed by the DOP and subsequently sent back to the respective departments for feedback. Once the feedback process was completed, the DOP compiled the departmental plans, thus formulating MOWRAM's development plan. A final meeting with the same participants from the previous meeting was then organised to review and finalise the planning document, ensuring a good flow of information, especially in terms of the inputs, outputs and outcomes of the plan.

⁵ Within MAFF, there was one DOP sitting within the Ministry building (referred to MAFF's DOP), and one for each individual division. For instance, the General Directorate of Agriculture and the Fisheries Administration each have their own DOP coordinating the planning in their respective divisions. The DOPs worked vertically with MAFF's DOP.

At this stage, the inclusion of CCA into department and ministry development plans is administratively plausible; however, assistance from the climate change committees, researchers and/or knowledge intermediaries is needed because planners are not accustomed to evidence-based planning or mainstreaming climate change concepts. According to an interview with Cambodia's Climate Change Alliance, the CCSP working groups of MAFF and MOWRAM and the Cambodia's Climate Change Alliance held a few separate meetings with the DOPs of their ministries. The aim of the meetings was to present their ministry's CCSP and identify possibilities for including some climate change concerns into the ongoing design of MAFF and MOWRAM's development plans. The process was not enough to enable them to meaningfully mainstream climate change into their development plan. Given the important role of department-planners, it is important to also engage them in the process of mainstreaming climate change. By doing so, mainstreaming climate change will go beyond the inclusion of climate change concerns into planning documents towards building awareness of CCA and creating the capacity to use that knowledge by department-planners and the DOP.

At the GDOP, the NSDP secretariat office then collated the draft version of ministries' plans into a preliminary first draft NSDP. At this stage, if the GDOP had feedback or needed any clarification from any specific ministry, they sent their queries and comments to the DOPs via telephone, email or an in-person meeting. This process usually took a few rounds of feedback. One respondent from MOWRAM's DOP confirmed this, saying, "the process was to ensure that all necessary ministries' strategic priorities were included in the NSDP." Once all these technical details were completed, *a first draft NSDP* was produced. Once the first draft NSDP was completed, the GDOP organised a technical consultative meeting with the planning teams of the line ministries (generally with the director or deputy director of the DOP), to review the first draft of their section in the NSDP. The GDOP then revised accordingly, producing a *second draft NSDP*. At this stage, the inclusion of climate change concerns is still possible, though it needs to be channelled through the DOP of line ministries or directly to GDOP. Mainstreaming climate change at this stage will, however, have less benefit, because department-planners are not engaged.

The GDOP then submitted the second draft NSDP to DPs (i.e. UN and multilateral funding agencies and NGOs) for input. It was reported that the WB and UNDP coordinated the feedback process among DPs for the previous NSDP (2009–2013). One DP respondent confirmed this, saying that, “the Centre for Study and Development in Agriculture provided inputs relating to pesticide and fertilizers to the previous NSDP through the feedback process.” Comments were then submitted to the GDOP for consideration, and they generally were taken. The respondent, however, clarified that in “instances where there were controversial ideas or/and statistics between line ministries and DPs, the GDOP suggested they discuss it in order to reach an agreement.” A revision at this stage produced a *third draft NSDP*, which was then submitted for a consultative meeting among the leaders of the planning teams of the line ministries. It was reported that the DOPs of the line ministries also tended to assist with technical details if needed. This is another important stage for including climate change concerns, if actions were not drafted or had been insufficiently done at earlier stages of the process. Mainstreaming climate change at this stage will, however, have fewer benefits; as the key planners, either the department-planners or DOPs, are not engaged. Revision according to the meeting’s decisions and inputs produced a *fourth draft NSDP*, which was then submitted to the Council of Ministers for high-level decision-making and endorsement of the plan.

There were a number of high-level decision-making meetings to finalise the draft NSDP and the inclusion of climate change concerns at this stage is unlikely. A series of meetings with the Council of Socio-Cultural and Economic Lawyers were undertaken, aiming to ensure the accuracy and precision of language and to minimise the political sensitivities of the document. Then, three high-level decision-making meetings were organised. A first meeting was conducted with the Secretary of State of the line ministries to further review the political and technical content of the document. A second meeting was organised among the ministers of the line ministries, chaired by the Deputy Prime Minister in charge of the Council of Ministers, to endorse the plan. A final decision-making meeting with the Prime Minister was then organised to approve the document. After approval from the Prime Minister, the planning document was submitted for endorsement to the National Assembly and then to the King. A

respondent from the GDOP confirmed that an oral presentation by the Minister of Planning and his technical team (the GDOP) was conducted at the National Assembly prior their endorsement.

Once all these exercises were completed, the GDOP disseminated the official NSDP document in print to line ministries for implementation. Line ministries developed or revised their ministry's five-year development plan for implementation according to this NSDP, which was used as a practical guide for annual activities planning. According to MAFF and MOWRAM respondents, the development of annual activities plan was based on the medium-term development plans; however, the proposed activities or projects were designed according to the experiences and opinions of their officials. Although some climate change concerns may be included in the ministry's medium development plans, the development of annual activities plans should make use of relevant and up-to-date vulnerability assessment results. Given the fact that Cambodian planners are not accustomed to evidence-based planning, technical assistance is required before they are capable of doing it by themselves.

Respondents reported that the implementation of MOWRAM's development plans was made possible by three sources of funding: government budget, multilateral support (i.e. via UNDP and WB) and bilateral support (i.e. through agreements between Cambodia and another country). According to the MAFF respondents, there were two sources of funding supporting MAFF's development plans: government budget and multilateral funding. This was explained that because MOWRAM has a mandate to develop water-related infrastructure, for example irrigation networks, it is entitled to bilateral support. For this specific entitlement, MOWRAM also develops its annual public investment program to guide infrastructure investments. The GDOP is authorised to conduct mid-term (two and a half year) and final evaluations in order to monitor the progress and achievement of the NSDP implementation. Evaluations results were debriefed to line ministries and the Council of Ministers before being officially released, and they were used for informing the development of the next NSDP.

3.5 Discussion

This research has found that the Cambodian national development planning is participatory, in the sense of involving individuals from different departments and ministries, but restricted to other actors such as researchers, civil society and the private sector. Füssel (2007) notes that scientists, practitioners, decision-makers, and policy and economic analysts play important roles for successful adaptation. Engaging climate change scientists and researchers in vision-building will assist planners in making their development plans more climate-resilient (Veraart & Bakker, 2009). As Lebel et al. (2012) emphasise, some aspects of CCA remain unfamiliar for planners, therefore technical assistance is needed. Füssel and Klein (2006) further suggest that it is essential to maintain a constant dialogue between researchers and relevant stakeholders as part of adaptation policy assessment. Given the lack of domestic climate change scientists and researchers, the roles of climate change committees or CCSP working groups in the national development planning are crucial. However, as found in analysis of the national planning process, none of these stakeholders were directly engaged in the process. This is a major disconnect that warrants special and urgent attention. As indicated in the adaptation literature (Preston et al., 2013; Veraart & Bakker, 2009), planning for climate change requires strong collaboration among scientists and researchers, policymakers, planners, and practitioners.

The research also found that the national development planning processes in Cambodia are flexible, in the sense of providing entry points for new issues like climate change to be placed onto the agenda. There were a number of feedback processes in the national development planning in Cambodia, especially during the design stage, from formulating department development plans to developing a second draft of NSDP (see Figure 3.1). These provide opportunities for including climate change concerns into the development policies (NSDP and ministries' development plans). According to the planning process, mainstreaming climate change should effectively start with the process of building development-visions, thus framing climate-resilient development. Then, practical applications of CCA should be integrated in the departmental plans and the foundation of the ministry and national strategic development plans. Mainstreaming

climate change in the first phase of the planning cycle could diminish stakeholders' perception that CCA is an additional activity that requires additional costs. Thorough discussions between CCSP working groups or/and climate change committees and department-planners and DOP on integrating relevant CCSP sections are therefore essential as Cambodian planners have limited understanding of CCA and are unaccustomed to evidence-based planning (Dany et al., 2015).

At a higher level, the inclusion of the climate change agenda into the Rectangular Strategy would encourage mainstreaming climate change in Cambodia because it is the key policy document that guides the development of NSDP. However, politically enforcing mainstreaming climate change with limited institutional capacity may result in "just wasting the resources or even maladaptation," as one respondent put it. This implies that mainstreaming climate change should be a gradual and iterative process and, as noted by Ayers et al. (2014), building climate change related awareness and the capacity of key stakeholders is a fundamental first step. Pervin et al. (2013) agree with this, arguing that it is crucial to develop approaches and capacity that are embedded in the existing planning system in order to effectively mainstream climate change.

Climate change institutional capacity-building in Cambodia in the past was very restricted and ineffective. This is evidenced in that although climate change related capacity building in Cambodia has been implemented for more than a decade, the stakeholders have a poor understanding of climate change vulnerability, adaptation and assessment methods (Dany et al., 2014). Consistently, as indicated in the climate change strategy, climate change institutional capacity-building during the last government period was only directed towards the CCD (see Table 3.1). A lack of incentive and motivation of stakeholders to learn new things, such as CC, may also be another reason for ineffective capacity-building (Willems & Baumert, 2003). A further reason could be that capacity-building programs implemented were not effectively targeted, meaning their design was not specific enough for different groups of stakeholders.

Climate-specific capacity-building, for instance, on how to conduct vulnerability assessment, climate change impacts studies, modelling and emission inventories studies,

is needed and should target key local universities and research institutes (e.g. the Royal University of Phnom Penh, the Institute of Technologies, the Royal University of Agriculture, the Department of Climate Change, the Department of Metrology and the Department of River Works and Hydrology). This will build domestic scientific capacity toward producing targeted scientific information for mainstreaming climate change, which is the second step for mainstreaming climate change (Ayers, Huq, Wright, et al., 2014). The generation of scientific evidence that is locally relevant and supports decision-making is challenging but crucial, therefore investing in building local scientific capacity is required (Ayers, Huq, Wright, et al., 2014; Lebel, 2014). Adger et al. (2005) further argue that the costs of adaptation can be reduced with more accurate information about future climate change.

The lack of local meteorological expertise and training centres in Cambodia presents significant challenges for MOWRAM in meeting its mission to provide accurate and timely weather forecasts and early severe weather warning information. Overseas development assistance, including climate change funds that aim to support this sector, should therefore support both infrastructure and human resources development. Given the fact that there are no local meteorology training programs, overseas development assistance should consider supporting young scholars in obtaining their education, preferably starting with undergraduate degrees in meteorology and climate sciences, which are critical for developing this sector. Additional training for relevant officials is also essential. In the long run, it is vital to develop such training programs locally in Cambodia.

Climate-relevant capacity-building should be targeted to relevant ministries (especially relevant department-planners and DOP), universities and research institutes, and civil society. The training should have two purposes. Firstly, training should build the capacity of policy stakeholders to enable them to mainstream climate change concerns and adaptation projects into their development plans. Pervin et al. (2013) stress the importance of assisting policy stakeholders to be able to rationalise what ‘needs’ and ‘can’ be done within the available institutional structure and capacity. Secondly, training should build the relevant scientific capacity of local academic institutions.

Therefore, capacity-building related to adaptation measures for agriculture should be targeted at the relevant departments of the General Directorate of Agriculture, the Royal University of Agriculture, the Cambodian Agriculture Development and Research Institute, and some civil society organisations such as the Cambodian Centre for Study and Development in Agriculture.

A further way to build the climate-relevant capacity of policy stakeholders is to involve them in climate change research (i.e. vulnerability assessments) to facilitate the co-production of knowledge and generate their interest (Armitage et al., 2011; Lemos & Morehouse, 2005). Also, it is important to engage them in developing climate change related policy, such as with the national CCSP and its ministerial components. Having engaged them in such processes would improve their understanding on how the strategy can be realised in practice. Furthermore, engaging them in climate change policy development will build their relationships and trust with climate change committees and encourage them to develop a sense of ownership of the policy. Experience from the development of Cambodia's NAPA suggests that the participatory process was as important as its outcome (the policy documents) in promoting CCA in Cambodia (Bowen et al., 2013). Moreover, given the traditional learning style in Cambodia, especially for senior government officials, classroom training (teaching-based) with illustrations and field studies of relevant best practices is recommended to be part of the capacity-building programs.

3.6. Conclusion

This chapter focused on the roles of different stakeholders in the national development planning process in Cambodia, and their influence on decisions to mainstream climate change concerns. This research has indicated points of leverage in the Cambodian planning system where inclusion of climate change concerns into development policies could be made and has identified potential pathways for strengthening climate-informed development planning in Cambodia.

The research has shown that the Cambodian national development planning is participatory but not sufficiently inclusive; it is also flexible, but not adequately informed. There are plausible entry points to take into account climate change in strategic plans, both in the water resources and agriculture sectors and more broadly within the national development planning system, for better climate-informed planning. There has been reasonable progress in terms of developing policy frameworks, resulting in more considerations of climate change in the current 2014–2018 National Strategic Development Plan. Further mainstreaming of climate change in Cambodia at this stage needs to focus on building local scientific capacity and relevant institutional capacity, which is an important step to move forward to a full integration of climate change concerns into the country's development agenda.

An integration of climate change concerns in the national development plans would provide relevant organisations, such as Ministry of Agriculture, Forestry and Fisheries and the Ministry of Water Resources and Meteorology, with climate change-related mandates to incorporate into their responsibilities and activities. Moreover, with such mandates, they would be entitled to climate change-related resources, including information, knowledge and funding. However, in order to effectively mainstream climate change, institutional capacity on both climate-specific and climate-relevant knowledge is required.

From the perspective of resources constraints, it is recommended that capacity-building programs should be targeted, providing effective training to carefully selected stakeholders who will drive their institutions toward making decisions and planning for climate-resilient development. The study suggests providing climate-relevant capacity-building to department-planners, key officials of the Departments of Planning of line ministries and the officials in the General Directorate of Planning who coordinate the development of the National Strategic Development Plan to enable them to make meaningful mainstreaming climate change into their development planning. The role of local academic institutions as a local scientific information body and building its capacity to be a scientific information source for Cambodia should be prioritised. With the existing scientific capacity gap in Cambodia, international support remains essential.

As a short-term strategy, Cambodia should look for alternative sources of scientific information on climate change risk, vulnerability and adaptation. Much information is available, which although not necessarily location-specific for Cambodia, can still be relevant and useful.

In summary, this chapter aims to find points of leverage in the Cambodian planning system where the inclusion of climate change concerns into development policies could be made. It also provides insights into Cambodia's national development policy, especially decision-making powers, intentions to integrate climate change concerns and potential key actors for effective mainstreaming of climate change concerns into Cambodia's development policies. The insights mirror the institutions and governance processes and challenges in Cambodian development policy and planning processes, thus allowing the identification of appropriate entry points where the inclusion of climate change concerns can be integrated more meaningfully. In sum, this chapter reflects a broad picture of this research's framework and points to the need to identify appropriate pathways in addition to an important role of institutions and governance processes.

The following chapter demonstrates examples from the case study projects on local planning for climate change using community knowledge with a focus on information-generation and integration processes.

4. Integrating Community Knowledge into Local Planning for Climate Change in Cambodia

4.1 Introduction

There is wide recognition that climate change adaptation should be integrated into a nation's development agenda in order for that country to enable a coherent and synergistic sustainable development (Adger et al., 2007; Butler et al., 2014; Huq & Ayers, 2008). This integration process is referred to as 'mainstreaming climate change'. At a practical level, government representatives from regions at high risk to the impacts of climate change, such as Asia and Africa, have indicated there is a critical need for the mainstreaming of CCA into their development planning processes with the target of climate-resilient development (Pervin et al., 2013). Fussel (2007) argues that in order to mainstream CCA, additional attention and action from development stakeholders who have not taken climate change vulnerability into account with their past decisions are required. Mainstreaming climate change should focus on national and subnational level institutions and planning processes, because mainstreaming will be most effective if demand comes from domestic policy stakeholders (Ayers, Huq, Wright, et al., 2014).

Ayers et al. (2014) argue that mainstreaming can be interpreted differently, and there is no single best way of doing it in practice. The UNDP-UNEP's (2011) mainstreaming framework focuses on three components: identifying entry points, integrating climate change into policy development processes and implementation. Others have proposed broader or more detailed frameworks that include attention to enabling factors and capacity-building (Ayers, Huq, Wright, et al., 2014; Pervin et al., 2013). Local scientific information or other forms of evidence is a central for mainstreaming climate change (Ayers, Huq, Wright, et al., 2014; Pervin et al., 2013; UNDP-UNEP, 2011). The UNDP-UNEP (2011) framework also identifies the need to understand the connection between climate change and national development priorities, as well as the existing political, governmental and institutional contexts of a country in the process of identifying entry points for mainstreaming climate change.

Cambodia is classified as a least developed country with poor scientific capacity (Kian-Woon et al., 2010; Schwab, 2014). The availability of local scientific information for planning for climate change is very low (Dany et al., 2014). This presents a great challenge for Cambodia in planning for climate change. Using community knowledge for local development planning has long been practiced, with participatory rural appraisal being a common method used. The importance of community consultations in addressing disaster risk reduction is also acknowledged in the literature (e.g. Anh, Phong, & Mulenga, 2014; Hiwasaki, Luna, Syamsidik, & Shaw, 2014; Jha, Barenstein, Phelps, Pittet, & Sena, 2010). This chapter aims to examine local decision-making and planning processes in order to identify pathways for integrating climate change concerns, examine the processes for integrating climate change concerns that were employed in the case study projects (introduced below), and evaluate the vulnerability reduction assessment tool and process in generating community knowledge for the above purpose.

4.2 Case Study Projects

The Local Government and Climate Change and the Climate Resilient Water Management and Agricultural Practices in Rural Cambodia were chosen as the case studies for this chapter because they were in the later stages of implementing their phase 1 at the time of the study, thus allowing for an insightful investigation.

The LGCC project was aimed at building the capacity of local governments to enable them to develop their local development plans that target climate change resilience. The project was thus intended to identify and pilot measures to mainstream climate change into subnational planning, including funding mechanisms (National Committee for Sub-national Democratic Development Secretariat, 2011). The project was thus designed to undertake local vulnerability and adaptation assessments, and to integrate the assessment results into the local planning and budgeting process. It was financed by the Cambodia's Climate Change Alliance, with a budget allowance of US \$250,000 for a period of 15 months, commencing in January 2012 (National Committee for Sub-

national Democratic Development Secretariat, 2011). During the first phase, the project was implemented in three districts and one municipality of the Takao province.

The prime goal of the NAPA-FU project is to enhance adaptive capacity in order to prevent climate change-induced food insecurity in Cambodia (Royal Government of Cambodia & UNDP, 2007). Having acknowledged that the institutional capacity of government agencies and community organisations in Cambodia was constrained, the project aimed to strengthen capacity of relevant organisations in managing agriculture water resources, especially through demonstration projects. It was a four-year project that commenced in January 2009, with funding support of about US \$3 million from the UNDP and Global Financial Facility. The project was implemented in two agriculturally highly climate vulnerable districts: the Chhum Kasan district of the Preash Vihear Province (vulnerable to droughts) and the Bos Leav district of the Kratie Province (vulnerable to floods) (UNDP, 2010).

The LGCC projects were implemented by the National Committee for Subnational Democratic Development Secretariat (NCDDS), under the Ministry of Interior (MOI). The project received technical assistance from the United Nations Capital Development Fund (UNCDF), a project partner. At the implementation level, the project worked with province, district and commune governments administratively under the MOI. The NAPA-FU project was executed by MAFF, with the project board consisting of representatives from MAFF, MOWRAM, MOE, the International Fund for Agriculture Development, Agence Française de Développement and the UNDP. At an operational level, the project worked through the provincial departments and some district offices of Agriculture, Forestry and Fishery (PD AFF), Water Resources and Meteorology (PDWRAM), Environment, Women's Affairs and commune governments.

4.3 Data Collection and Analysis

The data collection process involved conducting interviews with relevant participants (see Section 1.6) The interview questions for this case study is in Appendix C. After the interviews were completed, the interview notes and key observations were reviewed and

summarised using the interview guides and translated into English. The interview information was analysed using the NVivo software program (version 10). The information was firstly autocoded according to the questions set in the interview guide. Coding of subthemes was done according to what emerged from the interview transcripts and relevant reports.

4.4 Results

4.4.1 Administrative System and Local Planning Process

According to the respondents, there had been some changes made in local governance and to the planning systems prior to the interviews taking place. The existing Cambodian subnational planning process involves top-down and bottom-up approaches and it consists of five-year development plans, three-year rolling plans and annual investment plans, wherein the five-year development plans are used to inform the three-year rolling plans and the annual investment plans (Figure 4.1). The development of the local governments' development plans were made in alignment with the national development plan of MOI (see Figure 4.1). To facilitate the implementation of this new system, the MOI developed its 10-year development plan by splitting it into three phases of three to four-year implementation plans, which are then called IP3 (a three-year implementation plan). An official from NCDDS stated that one of the goals of the IP3 is to strengthen the capacity of subnational governments concerning planning and budgeting. The NCDDS facilitates the implementation of the IP3, and, at the time the fieldwork for this study was conducted, it was going through its first phase (2011-2013).

The provincial IP3 is developed and updated annually and is facilitated by the Provincial Department of Planning (Figure 4.1). As indicated in the figure, the commune investment plans (CIPs) were the basis for the provincial IP3. An integration workshop at the district level was organised, aiming to combine commune development plans into individual district development plans that were each referred to as 'a district priority actions matrix' (DPAM). The DPAMs were then submitted for discussion at an integration workshop at the provincial level, producing the provincial IP3. During the

workshops, relevant stakeholders including district and commune governments, specialised departments and local civil society organisations were engaged. The engagement of the stakeholders aimed to align and harmonise their development plans, thus enabling the local development to operate more efficiently and effectively. The development plan of the commune government was central for this alignment and harmonisation. Within the planning processes, an integration of climate change concerns can be made directly during the development of the commune development plans. The inclusion of climate change concerns in the national 10-year development plan of MOI that serves the IP3 will accordingly encourage more attention regarding integrating climate change concerns into the planning provincial IP3.

The majority of the case study respondents identified lack of funding as a key barrier to mainstreaming climate change. In addition to the lack of funding, there was also issue of funding uncertainty which can cause misunderstandings, which in turn can undermine trust and the relationships of relevant stakeholders in local development projects, especially between commune governments, specialised departments and NGOs. Some respondents from specialised departments acknowledged that it was risky to agree to support local governments' projects before receiving funding. One of them shared their experiences:

In a few instances, we signed agreements to support commune governments' projects, but we could not do them because only parts of the proposed budgets were approved, and there were delays in transactions of the funds. At those times, commune governments kept calling us to kick-off the projects; some of them thought that we had cheated them. For this reason, I did not want to attend the district integration workshops on behalf of my department. I sometimes felt uneasy when they asked for support from my department, because we were not able to offer any assistance.

In confirmation of the above statement, a few local government respondents also expressed their experience with this issue. One of them said, "in some instances, even though some contracts were signed during the district integration workshop, they were not implemented." The issues are critical because relationships and trust are important

for local development, especially in addressing climate change vulnerability, where collective actions are required.

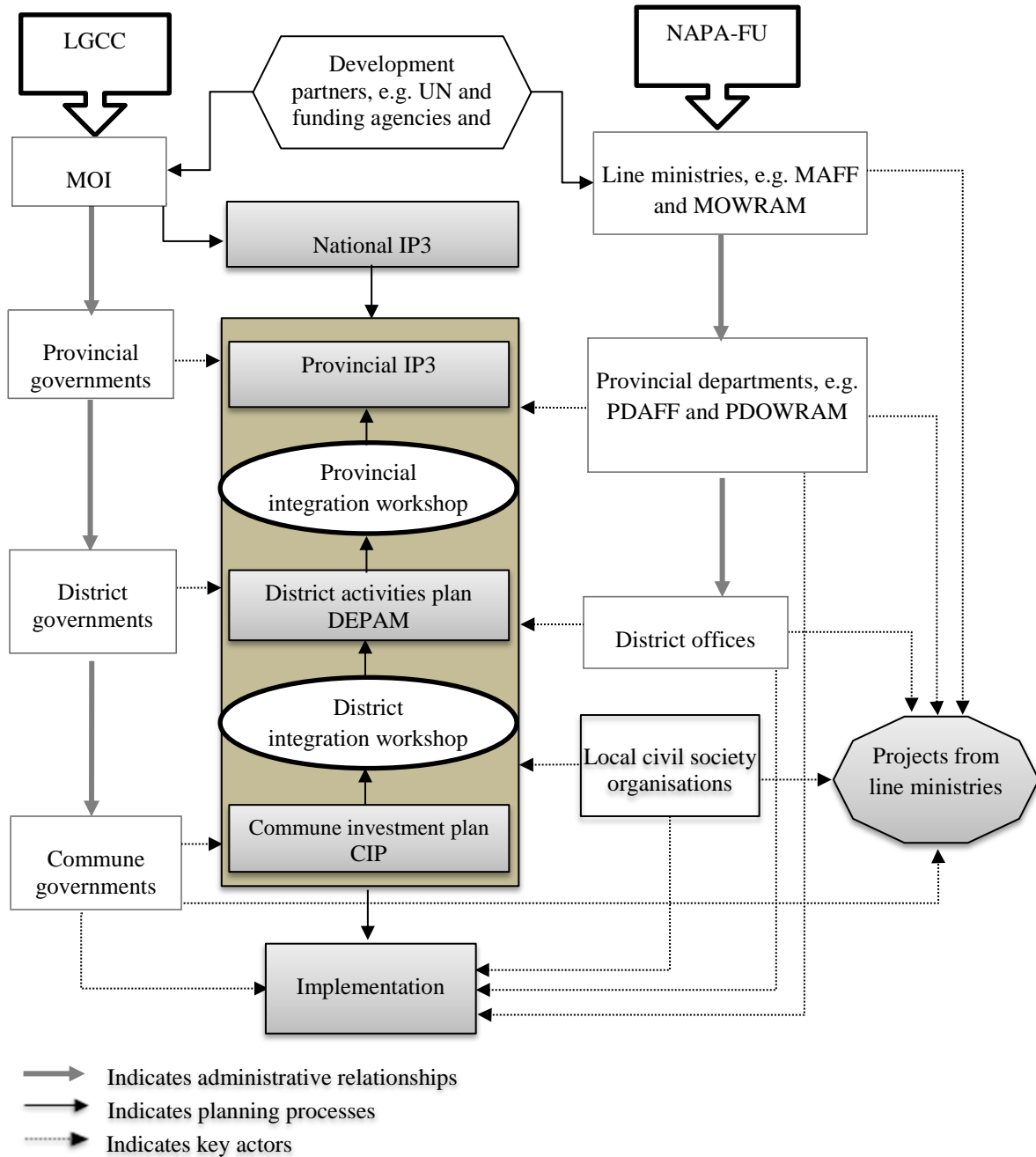


Figure 4.1 Local planning processes

Source: Author, 2015

In addition to supporting local development plans, the specialised departments also implemented some of the projects of their respective ministries; for instance, the NAPA-FU project, which was directed and managed by MAFF. Although the projects were vertically implemented from line ministries at the national level through to their provincial departments and district offices (some ministries such as MAFF have divisions up to district level setting up as an office, while some others only have their provincial departments), they should work in consultation with commune governments. However, in practice, there were many instances where communications were insufficient. One NAPA-FU respondent stated, “I observed that some local governments were not aware of projects that were implemented in their localities because the projects were implemented by the specialised departments.” Some local government respondents also reported that some NGOs implemented projects in their areas without even informing them. This suggests that more alignment between national and subnational development plans, as well as those of DPs and collaboration among multi-stakeholders in development processes, is needed.

Many respondents thought that the IP3 system was an appropriate channel for mainstreaming climate change into local development plans, regardless of the many prevailing challenges. One LGCC respondent explained, “local governments will not consider it [mainstreaming climate resilience] as an additional work if it is operated through existing systems, and it will continue after the completion of the projects.” The respondent further explained that if a new system is developed for this purpose, it can cause fragmentation and conflict. One NAPA-FU respondent agreed, saying, “mainstreaming climate change into subnational development plans should be done systematically from national to provincial, district and commune levels, and they should be implemented through NCDDS.” The respondent further clarified that this is because within governments, organisations respect the authority of higher level institutions, and local governments are administratively under the MOI with NCDDS as the division in charged. Another NAPA-FU respondent also confirmed that without authorisation from the national level government (referring to NCDDS), local governments were reluctant to mainstream climate change into their development plans. At a technical level, assistance from specialised departments remains essential; for instance, agriculture

officials are more knowledgeable about farming systems than local government, and thus their participation in local development is crucial.

4.4.2 Integrating Climate Change Concerns into Local Planning and Decision-Making Processes

The NAPA-FU project used the results of VRA to inform the project's annual planning and commune development plans. For the first purpose, the VRA results were consulted during annual planning, where project officials at all levels, including some members from commune governments in the project sites, worked together. One respondent commented, "VRA is like a road map for us: it tells us what the local needs are, and what responses are required to meet the needs. We [the project implementation team] always consult VRA results in our planning – it gives us direction where to go next." The VRA reports in print were also sent to relevant specialised departments for use, according to the respondent.

There were a few approaches that the NAPA-FU project used to integrate VRA results into commune investment plans. The project implementation team organised a meeting with key persons from the commune government (e.g. commune governor, assistant, council members) to present the VRA results of their commune before the CIP was developed. The meeting aimed to facilitate the integration of climate change resilience projects identified by the VRA into their CIP. One respondent described the process: "we organised a kind of dissemination workshop explaining to them [commune governments] about climate change and its impacts. We also provided them a list of adaptation measures identified by the VRA in order for them to consider including in their CIP." Another approach was that the members of the project implementation team took part in the process of CIP development. One respondent told us that "last year [2012] eight commune governments invited us [VRA facilitators] to assist them in developing CIP. We took along the VRA reports and informed them the relevant results; nevertheless, we respected their decisions."

For the LGCC project, the VRA results were straightforwardly used for commune development plans, as it was implemented through local governments. One LGCC

respondent told us that, “we [the commune government] made some adjustments to our development projects according to the results of the VRA. For instance, we discussed building roads that can tolerate floods based on the level of floods from the previous years.” The LGCC respondents also told us that the VRA results from communes were combined to form a CCA plan of their respective district: a supplement document to the district’s five-year development plan. They explained that the adaptation plan was not integrated with the district development plan because there were mismatching schedules in the development of both documents.

The LGCC project created a ‘climate resilience top-up grant’ that commune governments can apply for; the annual total top-up grant for each district was informed to districts and commune governments before the development of CIP. The purpose of the top-up grant was to support any adjustments that made rural infrastructure more climate resilient. In a group interview with local governments, they said, “we understand that the top-up grants are not for constructing longer roads or additional roads, it is for making them stronger or putting culverts to release water during extreme rainfall.” As this money was a top-up grant, it covered one-third of the cost of small-scale infrastructure development projects (up to 15 per cent of that amount could be used for technical assistance), with the rest being covered by the commune fund. The infrastructure projects were implemented by commune governments.

In order to obtain the climate resilience top-up grant, applicants submitted their proposal to the project management at the national level through the IP3 system. The selection of grant applications was done via a ‘project prioritisation workshop’ organised at district level, where representatives from commune governments, generally two to three members from each commune, attended the workshop. The workshop was facilitated by the national project officials, with assistance from provincial project teams. In term of approaches, the applicants presented their proposals, explaining the significance of the project for local development and how the top-up grant was intended to be used. They also presented their budget breakdowns and implementation schedule. After the presentations, participants were asked to score the proposals using four criteria (see

Table 4.1); these criteria and their weights were resulted from a prior meeting among key project stakeholders, according to the national project officials.

Table 4.1 Criteria for assessing applications for climate resilience top-up grant of the LGCC project

Criteria	Weight (per cent)
Projects are in climate disaster-prone areas	30
Projects can be completed in one year	15
Projects provide highest benefits to communities	20
Projects will use budget effectively and efficiently	35

Each commune had only one vote; therefore, representatives of each commune needed to discuss and agree on the scores. Projects with high scores were financed; however, some negotiations were made in situations where budgets needed to be reallocated. For example, if five projects were selected and the accumulated budget for the first four projects took up almost all of the grant money, negotiation ensued so that the fifth project could be included. The negotiation process was started by the facilitators asking other projects, especially projects that requested large amounts of funding, to consider cutting down their budgets in order to support the final project. Overall, the impression about this negotiation process was that although there was competition among applicants, the process was professional and benevolent. This implies that transparent decision-making processes developed good relationships: a foundation for building trust.

As seen in the workshop, commune assistants played a very important role in the process and they should be the target for relevant capacity-building. According to local government respondents, commune governors were elected through political parties and they were generally senior people with fairly limited education; this was similarly observed about members of the commune councils. Only the commune assistants were recruited through a national process as an official of the MOI to assist commune government and hence ensuring the functional administration of the commune. They are generally young and have specific qualifications.

Research respondents raised a number of issues concerning mainstreaming climate change resilience projects into local development plans. One respondent pointed to the large development deficits as a key constraint in integrating climate concerns into local development plans, articulating that, “...some basic needs such as food, water, and electricity are the real and urgent needs for people here.” Along with these arguments, many of the respondents indicated the lack of funding as a key challenge in promoting climate resilience development in Cambodia. Similarly, the national level official of the LGCC project also raised concern that the project’s budget allocation for climate resilience top-up grants was limited, which restricted the number and amount of grants available, which in turn can demotivate commune governments whose projects were not funded or renewed.

The limited understanding of commune governments about climate change and climate resilience development was mentioned by a few NAPA-FU respondents, who cited the fact that there were many terminologies involved. One of the respondents, however, argued, “they were not able to select correct terminologies for use in writing their CIP documents, but I think they understood the concept, say if a pond with a three-metre depth does not provide enough water, they know that it should be deeper in order to store more water.” The respondents, however, agreed that it is important to provide more climate change related capacity-building to local governments, so that they can improve their understanding and hence enable them to effectively integrate climate change resilient concepts into their local development plans. A few local government respondents, on the other hand, told us that it would be useful for them to get training relating to ‘coordination and conflict resolution’ so they would be able to assist communities more effectively.

4.4.3 VRA: Data, Data Collection Processes and Associated Challenges

According to the research respondents, both projects used VRA as a tool in collecting local climate change information for local planning. Training on VRA was organised for facilitators to enable them to facilitate the VRA process, using a VRA guide for practitioners that was produced in the local language by the Small Grant Program and

the UNDP (see section 4.4.4 for more discussion about the guide). It was reported that the LGCC project offered the training to local governments: commune, district, and provincial. The NAPA-FU project targeted the project officials who were the counterparts from the provincial department of Agriculture, Water Resources and Meteorology, and Women's Affairs for its VRA capacity-building activities. One national official of the NAPA-FU project reported having participated in the development of the VRA guide and hence was knowledgeable about the tool. Similarly, one national official of LGCC claimed to having practiced using this tool for some time in previous work. The officials were the VRA trainers for the projects.

Many respondents from both projects who were involved in the VRA process described VRA as focus group discussions, where the general participants were villagers who were grouped according to their age groups and gender. Each group was composed of between 10 and 20 participants, according to a few NAPA-FU respondents. One respondent from LGCC project specified that the selected participants were preferably aged 40 years and above. The respondent explained, "the reason is that these people may hold more memories about local climatic events that happened in the past." The gender-based group discussions were conducted to obtain the opinions and perspectives of both men and women. Additionally, the focus group discussions of the NAPA-FU also included groups of local governments (mixed genders and aged groups) in order to compare their opinions and perspectives with those of local communities. One NAPA-FU respondent stated, "the reason for having local government groups is because we want to cross-check the opinions, especially in terms of local needs and proposed adaptation options, between local governments and communities." The NAPA-FU project conducted VRA at the village scale, whereas LGCC conducted VRA at the commune scale. This difference may be because the NAPA-FU project was much longer and larger (in terms of funding) than the LGCC project, and hence had more time and resources to conduct specific community assessments.

Concerning the process of conducting the focus group discussions, one NAPA-FU respondent reported that facilitators first informed participants about the purposes of the discussion. The discussions' aim was to brainstorm ideas for local adaptations, using

trends of historical climate changes, particularly climatic extremes. One local government respondent who participated in the assessment as a participant confirmed the process, telling us that the VRA discussions analysed trends in changing climate, looking from the past to the present, then identified the needs and response options. One LGCC respondent elaborated that:

we asked them to document climate extremes, such as floods and droughts in 1960s, 1970s, 1980s, 2000s and 2010s. We then asked them, according to the trends of past climate extremes, what climate condition by 2020 do you anticipate? The groups were then assigned to examine how the climatic extremes impacted their livelihoods at the present time and in the future (say in 2020). With the current and anticipated impacts of climate change or extremes on their livelihoods, the groups then discussed on what they can do to better cope with – identifying adaptation options.

Another LGCC respondent added in relation to the discussion of local adaptation:

we discussed what the lower land communes can do for flood preparedness, how they could live lives during floods, and what needed to be done after floods. The participants thought about improving houses' quality, making boats so that communities still can run their business (a floating market) and live in their village during flooding.

Research respondents identified a number of challenges in conducting VRA, which included a lack of public awareness in general and on climate change in particular, a lack of respondents' participation, incomplete understanding of the tool of the facilitators, and issues related to using local knowledge that very much relies on memorisation (see Table 4.2). One respondent mentioned there was access difficulties to remote areas. Some of the issues mentioned can thus be addressed in the future to improve the quality of information so that it can be more reliable for local development planning.

Table 4.2 Challenges in using VRA

Key challenges	Number of respondents
Lack of respondents' participation	9
Lack of public awareness on climate change	6
Incomplete understanding of the tool of the facilitators	5
Issues of using local knowledge	4

The VRA facilitators found it difficult to establish interactions during group discussions due to a few reasons. According to many of the respondents, a prime cause of this challenge was that the communities have been demotivated by the lack of government support and view such discussions as unnecessary. One LGCC respondent told us, “there were difficulties in brainstorming ideas during meeting and discussions with local communities; they seemed to be discouraged by the fact that local governments cannot respond to their needs.” On the other hand, local governments were also discouraged by the lack of funding support for local development; a fact pointed out by another respondent during the VRA discussion: “we [commune governments] do not need to include many projects [adaptation measures] because they will not be supported anyway.” Other reasons that were mentioned by the respondents included the local communities being shy and afraid to talk in public; a lack of incentives to participate (e.g. no travelling allowances); and some villagers lived at remote farms, thus it was hard to invite and persuade them to join in the meetings. One NAPA-FU respondent, however, observed that communities that are highly vulnerable to climate change and disasters tended to be more participative and provided an example: “communities in the Thnot commune have suffered a shortage of water supply, the ponds dried up; they were willing to participate in addressing the issues.”

A few respondents from NAPA-FU projects thought that it would be more effective to work through local governments, especially when inviting participants to the discussion. One respondent, however, specified that it was important to provide some incentives, especially operational budgets (e.g. for telephone fees, travel costs and meal allowances) to the local governments to facilitate and motivate them to do the work. This incentive

system has been practiced among NGOs but has been restricted among government organisations. The respondent stated further that, “we should understand this... Local governments also face a lot of difficulties for their living; meaning they also need to work for their living. Therefore, if the project provided them some daily supplementary allowance, as many NGOs do, they would be very willing to participate.” According to local respondents, commune governors receive a salary equivalent to about US \$30 per month, whilst most of the council members work on a voluntary basis.

The issue of the accuracy and validity of the information was raised as a major concern. One NAPA-FU respondent shared that, “the information collected was based on memories and perceptions, thus it could have a lot of biases unlike scientific information.” Another respondent observed that some participants could not recall the long ago historical climatic events. This can easily happen, given the fact that Cambodia has gone through many years of civil unrest, and hence peoples’ main attention had been directed elsewhere. Another respondent observed that some participants did not understand the discussion, they simply just raised their hand and followed what the others in the group did. One LGCC respondent suggested providing participants with sufficient time for discussion. Another respondent from the NAPA-FU project additionally recommended that discussions should be divided into a few sessions at different times, or even on different days, suggesting that, “farmers were not willing to participate in a long discussion because they also need to do their daily jobs, so we should not compress too many sessions within one day.” Although implementing these suggestions may need more resources and time, they are worth considering for future meetings.

Weak public awareness in general and on climate change issues specifically was mentioned as another challenge in the VRA process. One respondent from the LGCC project reflected, “local communities were aware about climate disasters, but they could not think of what should be done to better respond to them.” Similar problems were encountered by the NAPA-FU project; as one respondent detailed, “farmer-participants could hardly understand the discussions, thus effective roles of the VRA facilitators are crucial.” One respondent suggested that given the complexity of the tool, discussions

should be assisted by visual banners and posters with relevant pictures. Yet, many of the facilitators also admitted that they did not fully understand the VRA tool themselves, limiting the discussion even more. One NAPA-FU respondent admitted, “with limited understanding and capacity of both participants and the facilitators, the discussions were not able to go far.” Another respondent told us that, “there were four questions that we asked. The last question was unclear to the facilitators, meaning we understood it differently and thus received different answers.”

In addition to the challenges in collecting information, respondents of both projects pointed to ‘analysing and presenting the information – writing reports’ as the most difficult part of the VRA process. One LGCC respondent elaborated, “the capacity of our team in analysing the information and data is very insufficient. According to the VRA guidelines, the information analysis should be done by VRA facilitators, but, practically, even us at a national level also found it hard.” It was reported that the NAPA-FU project recruited an international consultant to assist in analysing and writing a VRA report for the first year, pointing to the need for more capacity-strengthening for officials at all levels. To address this, it may be helpful to also engage local universities and research institutes in the VRA process and training.

The lack of understanding of the tool suggests the provided VRA trainings were not sufficient. Many of the VRA facilitators confirmed that they only received two days of training. There were resources and time constraints for the LGCC projects, which restricted the capacity-building. One respondent from the project told us that, “capacity-building is an *ad hoc* component of the project.” The NAPA-FU projects provided more opportunities on capacity-building, as well as having more time to practice it. One NAPA-FU respondent told us, “we first organised a VRA discussion in five villages collectively (with more than 200 participants), but we learned that it was too much to manage, and later on, we conducted for individual villages.” Furthermore, many VRA facilitators of the NAPA-FU project claimed that they gained better understanding of the tool after practicing it a few times. One national level-NAPA-FU respondent, who had participated in many VRA processes, suggested that the facilitators should be knowledgeable about the tool and have good facilitation skills in order to conduct VRA

properly. Another reason for the lack of understanding could be due to the complexity of the tool. The following section examines the VRA guide that is used by the case study projects in detail.

4.4.4 VRA Manual and Suggestion for Improvements

An examination of the VRA practitioner guide, the key resource for VRA training, indicates some issues that make the tool hard to understand. The most obvious one is the lack of precision of language and inconsistency of the technical terminologies used (e.g. climate change versus climate extremes). The issue was compounded with a lack of detail and unclear and even confusing explanations and illustrative examples. For instance, the guide suggests using ‘random sampling’ without explaining what it is and how it might be done. This is not sufficient information to guide facilitators, especially if it is intended to be used by non-researchers. At a content level, the tool is composed of two components. The first component involves an analysis of trends of local climate conditions, together with trends in climate-induced vulnerability on local livelihoods, particularly that of agriculture. The second component is the use of a ‘H form’ (see an illustrative example in table 4.4) for analysing the impacts of the changes in climate conditions on local livelihoods. There are four questions in this section (see Box.4.1).

Box 4.1 Guiding questions for the second component of the assessment

1. Have you and your community been exposed to any climate related hazards, e.g. floods, drought, increasing temperature? And how have they impacted on your and your community’s livelihoods?
2. If the intensity of the hazards is doubled, how will those hazards impact on your and your community’s livelihoods?
3. What are the barriers and challenges that you and your community have encountered in responding to the hazards? What solutions do you think they are helpful for you and your community to cope better to the hazards?
4. Please prioritize the solutions and rate your level of confidence that they will be achievable and sustainable?

Source: (UNDP, 2012, p. 12)

The tables for the analysis of trends, as demonstrated by the illustrative examples, are confusing as they try to include assessment of impacts, frequency and durations of different climate hazards through a time series all in one table. This information may be easier to understand if a single table is used for each individual hazard, e.g. flood, drought, or windstorm (see Table 4.3 for example). Using a time series to analyse impact trends of changing climate conditions on local livelihoods is not the best option, as it can introduce biases since rural livelihoods change with time due to various drivers, such as market demand.

Table 4.3 Proposed revised layout of table for analysing trend of an individual hazard such as floods

Key criteria	Timeframe			
	1980-1990	1991- 2000	2001-2010	2011- present
Frequency (number of events per the given period of time)				
Duration (average number of days per event)				
Maximum height (metres)				

The second component, the ‘H-form’ is also confusing. First, the guiding questions are inconsistent with their illustrative examples. Table 4.4 is an example of an illustrative H-form table for the first question in Box 4.1. Yet, the questions presented in Box 4.1 and Table 4.4 are not consistent. Also, most of the questions for the second component (Box 4.1) are applied with scale in the guidebook (see Table 4.4 as an example), and most of them are not appropriate. As indicated in Table 4.4, responses (solutions) to the impacts are also discussed here. Instead, they should be covered by the third question (see Box 4.1). The second question is a “what if” question, which involves very high uncertainty and can lead to overly emphasising climate change issues and disregarding other problems, such as forest protection, that are also important, given that most of rural Cambodian livelihoods are dependent on natural resources. Therefore, it is suggested that this question be deleted.

Table 4.4 Illustrative table on the first question in Box 4.1

Threats	Have you and your community exposed to any climate change presently? 1 2 3 4 5	Opportunities
	Solutions	

Source: (UNDP, 2012, p. 12)

It is suggested that the second component of the assessment be simplified; a proposed tool for this component is summarised in a Table 4.5. The revised table is designed for discussing the impacts of a specific hazard on a specific livelihood, such as droughts on rice cultivation. The exercise should be conducted for a few top priority livelihood options, against a few most severe local climate hazards, which will shorten the overall time of discussion. The impacts of climate hazards on key private and collective assets such as houses, schools, health care centres and natural fish habitats should also be included in the exercise. The questions should include a specific time frame as qualifier, say over the past five years (see caption of Table 4.5 for example). Using a scale should be avoided, because it can be very difficult for local facilitators.

Table 4.5 Proposed revised layout of table for analysing the impacts of floods on dry season rice over the last five-year period

Negative impacts of floods on dry season rice	→ List the top three to five barriers and challenges that you and your communities have been confronted with in addressing the impacts of floods on dry season rice:
Positive impacts of floods on dry season rice	→ List the top three to five priority solutions that address the barriers and challenges identified above and to improve your livelihoods overall.

To do this exercise, it is important to first discuss the livelihoods the community considers high priority. The most severe climate hazards can be taken from the trend analysis above (the first component of the VRA). Participants should be asked to analyse the negative and positive impacts of climate hazards on these livelihood options. The analysis may draw their attention to opportunities that may result from the hazards, for instance, floods migrate fishes to local habitats where they can breed thus resulting in more natural fish stock, therefore, in this case they should consider protecting and expanding local fish habitats as one of their solutions. The analysis also helps them to realise that some of the negative impacts are hard to address, thus alternative options should be considered. For instance, rice may not be able to tolerate prolonged droughts, thus alternative crops that need shorter time or can tolerate drought better should be considered. After completing the VRA, participants should be able to trade-off their priority solutions by analysing the expected benefits of proposed individual solutions, the limitations in implementing them and their associated costs (e.g. investment and operational costs).

4.5 Discussion

The study identifies a number of institutions and governance issues in subnational planning in Cambodia. The complexity of the planning process, the lack of alignment of national and subnational plans and the restricted and uncertain funding are the main causes of the issues. For instance, the lack of local governments' engagement in development projects that are implemented by line ministries or NGOs could result in a lack of ownership when the projects' outcomes are transferred to local communities for management. Subsequently, it will raise the issues of legitimacy, accountability and sustainability: key governance issues of CCA (Adger et al., 2005; Lebel et al., 2006; Nelson et al., 2007). These issues also created misunderstandings and mistrust among key stakeholders, while the lack of government support made the communities wary about putting their trust in local governments. Trust is an important elements in building relationships (Nooteboom, 2007); thus, promoting collective actions that are important when addressing climate change vulnerability at the community level (Adger, 2003). Given that the current subnational planning is still in its pilot stage, the findings are

timely and useful and can be used to improve the existing system especially since, as Fukuyama (2002) argues, good institutions increase trust in society.

The research respondents of both projects agreed that IP3 is an appropriate channel for mainstreaming climate change into local development plans. However, although the system to do so is in place, funding is required in order to mainstream CCA into local development in Cambodia. The availability of an adaptation or climate resilience top-up grant is critical, because with the existing commune fund, which is insufficient to meet the basic CIP, there was no motivation for commune governments to consider making any changes to their response to climate change. The LGCC project was also faced with a short timespan for meeting its objectives. For this reason, the implementation duration was included as one of the criteria for assessing the top-up grant applications (see Table 4.1). Adger et al. (2005) agrees with this, arguing that meeting objectives and outputs does not necessarily mean an adaptation project is successful. Respondents suggested that reasonable time be provided for implementation adaptation projects; this suggestion should be considered, especially by funding agencies, including the Cambodian Climate Change Trust Fund, which supports adaptation projects.

The respondents also pointed out, there is a need for political commitment from the government at all levels. Firstly, it requires commitment from local governments themselves. The commitment of a chair of a provincial IP3 can positively influence the governance of lower-level governments. Given the lack of manpower of local governments, both projects recruited some project officials. For instance, the NAPA-FU recruited a provincial project coordinator to assist in the implementation, while the LGCC project recruited a local engineer to take care of the quality of funded infrastructure. The officials were reported as very important for the success of the projects. Secondly, it requires strong commitment from the national level project team, which might involve visiting project sites more frequently. National project officials in the project prioritisation workshop played an important role as provincial officials were not experienced enough to effectively manage development projects on their own. In addition to acknowledging the need for support from multi-level stakeholders for planning for climate change (Adger et al., 2005; Butler et al., 2013; Daniell et al., 2011;

Thomas & Twyman, 2005), this study provides an insight into how such institutional support was arranged in the context of least developed countries like Cambodia, where institutional capacity is limited.

The project prioritisation workshop organised by the LGCC for integrating the climate resilient project into local development decision-making and planning process is participatory, which is apt when planning for climate change (Butler et al., 2014; Daniell et al., 2011; Wise et al., 2014). Furthermore, it can also be a model for assisting and empowering local governments for local development because the development fund was directly added to the commune fund; decisions were made by local governments themselves, thus assuring local priorities; and the full engagement of local governments in the process ensured equity, legitimacy and transparency. The process also provides an opportunity for local governments to share their experiences and knowledge, especially on how to develop project proposals. This capacity-strengthening is very important, given that Cambodia is highly dependent on overseas development assistance.

This study found that there are many challenges in using the VRA tool, leading to concerns over the validity and accuracy of the information provided. If information is invalid or inaccurate, it can have misleading implications in policy application. These issues are of great concern, because VRAs have been conducted to inform local development in hundreds of villages in Cambodia. The literature (Ayers & Huq, 2009; CARE, 2009; Hiwasaki et al., 2014) suggests community knowledge and scientific information be integrated to improve the quality especially if it intends to inform large scale adaptation projects. Although an integration of scientific information into community knowledge may help improving its quality, it remains a challenge in Cambodia, given that Cambodia's scientific capacity and communication are limited (Kian-Woon et al., 2010; Schwab, 2014). Thus, this study focuses on how to improve the tool (see Section 4.4) and the procedures to conduct VRA to improve the quality of the information.

Focus group discussions were used as a means to collect community knowledge in the case study projects and this approach fit well with the purpose of the VRA. As Richard and Mary (2000) indicate, a focus group discussion is appropriate for applied research that aims for decision-making, planning and needs assessment. From a technical point of view, some improvements can be done to increase the accuracy of the information. Firstly, the focus group discussion should not be crowded; between six and eight participants are recommended (Richard & Mary, 2000). Secondly, the research respondents suggested providing sufficient time for discussion – about 90 minutes for each session (Richard & Mary, 2000). If more time is required, the sessions should be divided into a series, as suggested by one respondent. In order to optimise information output, the literature also suggests that there should be three to four groups for one type of participant; however, there is a need to strike a balance between study design and the available resources (Richard & Mary, 2000). Therefore, project developers should bear this in mind when budgeting for the projects. Thirdly, instead of engaging large sample sizes, the assessment should take smaller but representative samples, which can be done by properly selecting the sample. Lastly, facilitators need to be well trained in both using the tool and how to facilitate. By the same token, it is important to raise the capacity of VRA facilitators as well as national project officials about the general concepts of adaptation.

From an organisational perspective, the VRA team should be composed of multi and interdisciplinary members and be facilitated by a research institute. The role of researchers and scientists in planning for climate change is underlined in the literature (cf. Fussler, 2007; Lemos & Morehouse, 2005; Veraart & Bakker, 2009). It is suggested that the team be composed of representatives from commune governments, preferably commune assistants, relevant specialised departments and NGO members, and be led by relevant local universities or research institutes at least until the local facilitators are knowledgeable enough to lead it themselves. The engagement of the researchers also addresses the concerns over data analysis and writing. Moreover, as they have participated in the whole research process, they should be able to produce research reports that are more accurate than what latterly recruited consultants can produce. Another benefit of engaging local researchers in the VRA process is that they can

facilitate and promote shared learning, which is an imperative benefit of the assessments (Yuen et al., 2013). Finally, given the lack of local research capacity, the engagement offers opportunities for building the capacity of local researchers and their corresponding research institutes.

In addition to generating climate-evidence for local development planning, the VRA should also be used as a platform to promote social learning among relevant stakeholders and communities. One of the aims of the VRA was to raise farmers' awareness about local development in the face of climate change (UNDP, 2012), which was in practice translated into raising communities' awareness about climate change. It may be more useful to use this platform to promote climate-smart farmers and/or villages. Given the fact that most farming in Cambodia is done on a household scale, meaning that decision-making occurs on an individual basis, raising the awareness of individuals on climate-smart agriculture can facilitate the changes. As Howden et al. (2007) stress, to overcoming barriers to adaptation requires a broad range of policies, from individual awareness to the development of efficient market strategies.

The proposed approaches for the VRA (see Section 4.4) would help triggering communities towards necessary adjustments and diversifying livelihood options and transformation processes (Butler et al., 2014; Nelson et al., 2007). There are a number of adaptation projects that have been piloted and demonstrated, especially in the field of agriculture and water resources management. The NAPA-FU project is a good example of a local project that aims to pilot a number of adaptation technologies for agriculture and community water resources development. At this point in time, some lessons and good adaptation practices should have been generated, and it is useful to share these with communities through VRA processes in order to encourage and facilitate them to become climate-smart farmers. To do so effectively, the VRA facilitators should therefore be composed of an interdisciplinary team. It may also be mutually beneficial to provide opportunity for agriculture students to be involved in such projects.

Future Work

Both of the case study projects have been scaled up. The LGCC project's second phase covered two provinces (Takao and Battambang), including seven districts and one municipality. This second phase received a total funding of US\$1.2 million from the Swedish International Development Agency to cover a period from mid-2012 to the end of 2014 (National Committee for Sub-national Democratic Development Secretariat, 2013). Similarly, NAPA-FU's second phase has been implemented from September 2013 to the end of 2015, with funding amounting to about US\$2.6 million; contributed mainly from the Canadian International Development Agency (UNDP, n.d). The community-based adaptation program of the UNDP also uses the VRA tool for the same purpose, though the projects were implemented by the NGOs. It is therefore important and interesting to further investigate how these projects addressed the many challenges that were identified in this study. There is also a need for more studies to improve on the tool or investigate others that have been used elsewhere, as these tools are extremely useful, especially in least developed countries where scientific capacity is limited.

4.6 Conclusion

The study suggests that the IP3 system is an appropriate channel for mainstreaming climate change in subnational planning in the study provinces with commune development plans as the foundation. There are a number of constraints that restrict the effective mainstreaming of climate change into local development in Cambodia, which include large development deficit, lack of alignment between national and local development plans, and lack of institutional capacity, including scientific capacity. The case study projects demonstrate a number of mechanisms for integrating climate change concerns into local development decision-making and planning in this constrained situation. A project selection workshop of the LGCC project is a good model for integrating climate change concerns into decision-making and planning processes, as well as for assisting and empowering local governments for local development. Such integration provides two main advantages. Firstly, it raises the awareness and capacity of local governments in many areas, including proposal development, planning and budgeting, in addition to awareness on climate change and climate resilient

development. Secondly, it facilitates the growing culture of evidence-based planning in general, and for climate change in particular.

There were many challenges in undertaking vulnerability reduction assessments, resulting in concern over the issues of the accuracy and validity of the assessment results. In response to these, this study provides some suggestions for improving the assessment guide as well as the conducts of the assessment. From a technical point of view, the assessment is more useful for non-infrastructure projects, for example agriculture, because in addition to the relevance and usefulness of its results, the VRA is a platform for experience-sharing between local communities, local governments and specialised departments (in the case of NAPA-FU) and, in the process, can raise local awareness of climate change and adaptation. There will be substantial benefits if the platform can create climate-smart farmers and villages (Füssel, 2007). Another advantage of the assessment is that it can act as a platform for enabling local governments and communities to work together, thus facilitating collective ideas as well as building relationships and trust, which are important when addressing climate vulnerabilities (Adger, 2003).

In summary, this chapter examines methods in collecting community knowledge and models in integrating it into local development planning and decision-making processes that were employed by the case study projects. This alternative source of information, although not scientific, is important for local planning for climate change because Cambodia's scientific capacity is limited. Given the importance of the community knowledge in local planning for climate change, the chapter scrutinises the climate change information-generation tool, procedures, and key actors that should be engaged in the collecting of such information, with the overall aim of improving it for future use. Also, through examination of subnational planning systems, the study suggests that the IP3 is an appropriate channel for integrating climate change concerns into subnational development plans with commune development plans are the entry points. This chapter overall reflects on two key components of the study's conceptual framework: the institutions and governance, and the institutional mechanisms/applications that are appropriate for local development planning. Additionally, the chapter also briefly

discusses on the issues of climate resilient top-up grants and capacity-building which relate to ‘enabling factors’, the other component of the study’s conceptual framework.

The following chapter discusses the institutional mechanisms/applications and communication strategies for narrowing research and policy development to thus enabling and promoting (climate) evidence-based planning for Cambodia from the perspective of national-level respondents.

5. Narrowing Gaps between Research and Policy Development in Climate Change Adaptation Work in the Water Resources and Agriculture Sectors of Cambodia

5.1 Introduction

Planning for climate change adaptation requires a great deal of information (Carter et al., 2007; Moss et al., 2008; UNFCCC, 2006; Veraart & Bakker, 2009). Lebel (2014) argues that the lack of evidence-based CCA practices results from relevant knowledge being inaccessible, unused or missing. Incomplete knowledge of current vulnerability, uncertainties about projected future vulnerabilities and the cross-cutting nature of CCA work creates additional information-related challenges for adaptation planning. Gaps between research and policy in these situations are very likely unless there are strong linkages between research and policy communities.

Participatory approaches are important for adaptation planning (Butler et al., 2013; Daniell et al., 2011; Wise et al., 2014) as they can support social learning and lead to the co-production of knowledge (Armitage et al., 2011; Preston et al., 2013). Lemos and Morehouse (2005) argue that the interactions between researchers and stakeholders in the co-production process facilitate their understanding about co-produced knowledge and its applications and practical value. The interactions also allow stakeholders to exchange information, share learning and build relationships and trust, thereby promoting collective adaptation actions (Armitage et al., 2011; Lemos & Morehouse, 2005; Yuen et al., 2013).

Introducing knowledge intermediaries is another mechanism to enable the linking of research and policy development. Knowledge intermediaries facilitate the use of available information for policy development (Dobbins et al., 2009; Fisher, 2010; Jones et al., 2009; Meyer, 2010). Knowledge intermediaries may also build the capacity of research and policy communities (Dobbins et al., 2009; Jones et al., 2009), build relationships between researchers and knowledge users as well as with relevant networks (Dobbins et al., 2009; Fisher, 2010; Meyer, 2010), and create a culture of

using information for policy development (Meyer, 2010). In the context of CCA, incomplete knowledge and uncertainties imply there is a strong need for continual review and learning as well as robust decision-making strategies (Dessai & Hulme, 2007; Linham & Nicholls, 2010; Veraart & Bakker, 2009). Knowledge intermediaries may be especially important for developing nations in which local research capacity and policy stakeholders' understanding on the issues are limited (Jones et al., 2009).

Traditional modes of communicating research to policy stakeholders, for example, disseminating research reports to policy stakeholders, although often ineffective, remain an established practice, due perhaps to their familiarity and fact they do not require much additional effort. Finch (1986) indicates three main gaps in the communication process which warrant attention for effective uptake of research results. The first gap is an organisational gap which includes the difference in timescale between research activities and the period of time policymakers can wait for information and the status of the researchers, which may be lower than that of the policymakers, thus making it hard to influence them. The second one is a cultural gap, which includes the difference in ways of thinking and language used by researchers and policymakers. The third gap is the difference in the interests and concerns of research and policy communities. Finch (1986) suggests that productive personal contact between researchers and influential persons in the policy-making process can result in more effective communication of research to policy.

Two-way communication, or dialogue, between researchers and policy stakeholders is usually more effective than one-way communication (Geoffrey, 2007; Pretty & Ward, 2001) and important to narrowing research-policy gaps. Science-based stakeholder dialogue is a path for linking research and practice, urging stakeholders to share learning and thinking and to begin working collaboratively (Welp et al., 2006). Welp et al. (2006) define science-based stakeholder dialogue as a structured communication processes connecting scientists and policy stakeholders, for instance, through conferences, workshops and facilitated discussion. Füssel and Klein (2006) also suggest that it is crucial to maintain constant dialogue between researchers and relevant stakeholders as part of adaptation policy assessment.

Although a national climate change strategic plan has recently been developed in Cambodia to assist mainstreaming climate change into sectoral development plans, in practice, planning remains challenging due to the many limitations, for instance, lack of relevant information, resources and cooperation among stakeholders (Dany et al., 2014). This chapter aims to facilitate the strengthening of research and policy development of CCA in the Cambodian water resources and agriculture sectors. It pays special attention to planning processes that take into consideration climate-related vulnerabilities or climate-informed planning.

The research question of this chapter is how can the linkages between research/science and CCA policy development within the water resources and agriculture sectors in Cambodia be strengthened? The term ‘policy development’ in this chapter refers to the formulation of the policy documents and the implementation of such policies. The term ‘policy stakeholders’ in this chapter refers to policymakers, planners and practitioners collectively.

The chapter is comprised of three main sections. Firstly, it presents stakeholders’ observations and views regarding the present status of research and policy development. Secondly, it identifies associated the barriers and challenges to better linkages. Finally, it explores possibilities for strengthening the linkages and narrowing the gaps between research and policy development.

5.2 Data Collection and Analysis

The data collection process involved conducting interviews with relevant participants (see Section 1.6) The interview questions relevant for this study component include questions number 12, 13, 33, 34, 35, 36, 37, and 38 in the Appendix B. It was developed with the assumption that water resources and agriculture-related stakeholders had used relevant research information to inform policy development and planning. The guide was thus designed specifically to focus on the use of climate-related information. After testing the guide by completing a few interviews with government officials, it became

clear that this assumption was not correct – current planning practices depended very much on experience and observations. Additionally, government respondents indicated that they were not working on any CCA projects, thus no climate-related information was used. For this reason, the questions were changed strategically to focus on the use of research information more generally. Only the respondents who confirmed having used some research information for the development of policies or plans were asked for further detail, exploring if they used any climate change related information.

After the interviews were completed, the interview notes and key observations were reviewed and summarised using the interview guide and translated into English. Aspects of the digitally recorded interviews were transcribed where taken notes were not fully completed. Follow-up interview or queries were conducted for a small number of respondents whose first interview did not obtain sufficient information. Also, there were a few respondents who had comprehensive knowledge and experience to share which could not be covered within one interview, thus follow-up interviews were organised. The interview summaries were sent by email to the respondents for feedback and confirmation of their accuracy. Generally the respondents agreed with the summaries, and answered additional questions if requested. After amendments were made where necessary, the interview information was analysed using the NVivo software program (version 10).

The information was firstly autocoded according to the questions set in the interview guide. Coding of subthemes was done according to what emerged from the interview transcripts and was organised according to the themes identified by the relevant literature. For instance, strategies in narrowing research and policy include (but are not limited to) the promotion of science-based dialogue and discussion (Bohm, 1996; Jones et al., 2009; Preston et al., 2013; Welp et al., 2006), knowledge intermediaries (Dobbins et al., 2009; Fisher, 2010; Meyer, 2010) and the co-production of knowledge (Armitage et al., 2011; Lemos & Morehouse, 2005; Preston et al., 2013; Yuen et al., 2013). The patterns in responses and views were presented quantitatively and substantiated by pertinent narratives or illustrative quotes.

5.3 Results

5.3.1 Observations and Views on Linkages between Research and Policy

About two-thirds of the respondents, especially those from DPs and research organisations, indicated that there is a huge gap between research and policy formulation in Cambodia's water resources and agriculture sectors. One academic described the situation: "the two types of bodies [research and policy organisations] are just like water and oil - they always have different interests." The respondent further commented that policymakers perceive that research organisations usually just criticise their work. However, a few respondents observed that the gap between research organisations and policy stakeholders was not obvious or did not exist, noting that policymaking individuals and organisations also conduct research projects for their policy development. Most of the departments of MAFF and MOWRAM, for instance, had their own research units, with some functioning and others not due to a lack of resources.

Research and policy implementation were also reported to be very separate. Some 20 per cent of the respondents indicated that there was little connection between researchers and practitioners. Two respondents observed that the gap between the MAFF's researchers (and also planners) and companies that import agricultural inputs (e.g. chemical fertilisers, and seeds) was very wide. The respondents reported that some companies distributed imported seeds to markets before being laboratory-tested and approved by MAFF's specialised departments. They explained that the seeds can be inappropriate for local environments or cause negative effects on local species (e.g. through cross-pollination with wild populations), thus appropriate laboratory and field tests are required.

Another academic respondent considered the lack of engagement of local communities in CCA-related studies as a gap between research and policy development, explaining that research should have an important role in bringing out the voices and experiences of communities. The respondent stated, "sometimes we [researchers] discussed a lot

about CCA but important stakeholders were absent, like farmers, who are the most vulnerable group and have generations of experience in addressing climate stresses.”

The connection between research and policy in the agriculture sector, however, was claimed to be good by four respondents, all of whom were from MAFF. One respondent claimed that “the Minister of Agriculture, Mr Chan Sarun, always consults with research institutes – like Cambodian Agriculture Research and Development Institute.” According to this respondent, the policy on rice exports introduced new rice varieties and agricultural technologies that have resulted from Cambodian Agriculture Research and Development Institute’s research projects.

Within the fisheries subsector, linking research and policy were reported to occur via the TWG on fisheries. A TWG is a government–donor coordination body facilitating the implementation of national strategic development plans and aid effectiveness in Cambodia. TWGs are chaired by key government organisations and facilitated by one of the key funding agencies for that respective sector. It was reported that the Fisheries Administration’s research institutes always held discussions with a research review committee of the TWG on Fisheries (a project-based committee) regarding study design, methods, analysis and the results of studies. One Fisheries Administration’s respondent further claimed that since the establishment of the TWG on fisheries, harmony has improved among fisheries stakeholders in terms of the integrity of research and the transparency in use of research findings.

Linkages between research and implementation were also reported to occur via applied (pilot and demonstration) research projects where the relevant stakeholders (i.e. provincial agriculture officials, local authorities, and farmers) were jointly engaged in the research process. Three respondents from academia, DPs and MAFF reported having participated in a regional research project, *Developing multi-scale adaptation strategies for farming communities in Cambodia, Laos, Bangladesh and India*, implemented by the Australian Commonwealth Scientific and Industrial Research Organisation.

Two academic respondents mentioned working directly with agricultural students to provide them with agricultural engineering and technological knowledge and skills, such as plant breeding and farming systems, as a means to bridge research (or science) and policy implementation. It was explained that this is because the students are likely to be recruited as agriculture officials for governments or an NGO after the completion of their studies. One of the respondents reported that the Centre for Study and Development in Agriculture works to promote agricultural students who want to become self-employed in agricultural farming businesses by providing them with technical and practical training as well as seed funding support.

Half of the respondents agreed it is essential to narrow research-policy gaps. The respondents also acknowledged the important role of research organisations in policy development, suggesting that local universities should strengthen their research capacity. One government respondent stated that, “if we have relevant information, we will be able to make better decisions in term of what technologies (e.g. rice varieties, and cropping techniques) should be introduced for specific areas.” Another academic respondent agreed, saying that policy development should be informed by scientific studies, giving an example of the newly developed policy on rice exporting:

The policy sets targets unrealistically because it was not informed by scientific studies and I think it is very likely to fail... although we have large surface areas for agriculture, we do not have enough irrigation systems – water is abundant in the rainy season but short in the dry season. I have also noticed that many irrigation systems in Cambodia are not functional and consist of only main canals. The lack of subcanals implies water must be pumped from main canals to paddies, thus requiring additional investments (for pumps and fuel) that add to the costs of production, which many farmers cannot afford.

5.3.2 Barriers and Challenges in Narrowing the Research–Policy Gap

One of the main findings of this research is that the limited implementation of governmental policies and plans in the water resources and agriculture sectors in

Cambodia is one of the major barriers to improving the connection between research and policy. The reason given was that, with little implementation, there is no incentive to seek additional information or to do research. About 50 per cent of the respondents, especially those from government ministries, pointed to the lack of implementation of plans as a main reason for the gap. Because of the low rates of implementation, respondents from MAFF and MOWRAM did not feel it was necessary to have evidence-based plans and strategies. They explained that only a limited amount of the annual activities proposed were funded. A small number of respondents reported that they were reluctant to develop plans for their departments as they had not received any money from the government for implementation over the last few years. Experience and observation-based plans were generally perceived to be sufficient in this situation.

In the current planning process, although the development of annual activities plans was informed by the ministry's five-year development plan, the proposed activities and projects were based on experiences and field observations of department-planners (the director or deputy directors of departments). One MAFF respondent confirmed this, saying that, "because annual agricultural development plans were developed based on experiences and field observations, we do not need much scientific information for it." Another MAFF respondent, however, said, "at the present time, we do not need information to inform the planning process; in the future we may..." Although this respondent agreed with others that the experience and observation-based planning is sufficient at the present time, s/he seemed to expect that planning practices will become more evidence-based in the future.

Some 20 per cent of the respondents, especially those from DPs, commented on the lack of suitable information as the reason for the lack of connection between research and policy. One DP respondent argued that if Cambodia's water resources and agriculture sectors want to apply more climate-informed planning, they will need a great deal more climate-related information, noting that:

Climate change vulnerabilities are different from one region to another, thus we need to understand local climate hazards, high risk areas, and adaptation measures. For example, a community may suffer more from droughts than

floods, but in reality because flood has more immediate impacts it is ‘noisy’, making it easy to call for assistance; drought is ‘silent’ because it takes time to manifest itself, thus it is harder to get support.

The situation of how current climate-related information is generated, communicated and used was described by one DP respondent as:

The information is scattered and not well organised. It is just like we have ingredients to cook but in some instances they were insufficiently cooked or improperly cooked thus the food was not of reasonable quality, while in other instances, they were cooked but food was not marketed enough. For example, there was a study to map (index) climate vulnerabilities of 710 communes, but there has been lack of communication to make use of the information, especially in policy and planning development.

The respondents further commented on the ineffective and inefficient use of limited research resources, explaining that research projects were implemented by various organisations and individuals and easily duplicated. One academic respondent noted, “many individuals and organisations undertake research studies without knowing who is doing what.” Other respondents confirmed that their organisations had implemented small research projects for informing their organisations’ policies, programs and projects.

Some 25 per cent of the respondents, especially those from academic institutions and DPs, pointed to organisational and cultural gaps as barriers to linking research and policy development within the Cambodian water resources and agriculture sectors. The organisational issues that were observed by the respondents include the low status of research organisations and differences in time scale between research and policy. The cultural gaps as mentioned by respondents are that policymakers were not accustomed to evidence-based planning. One DP respondent argued that, “even the highest government policies, such as the Rectangular Strategy, were not developed on the basis of any research information.”

Three respondents mentioned the resistance of policymakers to research results, especially for issues relating to transparency and accountability in policy implementation. One academic respondent stated that “the gaps between researchers and policymakers were wider once research projects uncovered sensitive issues, for instance, related to land and forest concessions.” This suggests that concerns with transparency and accountability in policy implementation could be one of the underlying barriers to linking research and policy. Consistent with this interpretation is the view of some respondents that there was strong interest and willingness of policymakers to take on research results relating to technological options that did not deal with sensitive issues, for instance new rice varieties that are more tolerant to floods and droughts.

Two DP respondents also observed the frustration felt by policymakers who want to achieve results to showcase to the public for political motives (e.g. election campaigns) but had to wait for supporting evidence. For this reason, the respondents thought that policymakers are unlikely to practice evidence-based planning as it takes longer than conventional planning. One respondent noted that “policymakers want to see the results quickly, they cannot wait for long, say 10 or 20 years, while climate evidence-based planning could take considerable time to see the impacts or benefits.” The respondent explained that evidence-based planning needs more time as it requires more stakeholder consultation and research. Another respondent explained evidence-based planning as a combination of newly conducted research and implementing the project or program based on those findings. This explanation is consistent with common practice in development projects in Cambodia, where research is undertaken to inform project implementation. However, this perspective can be misleading as it is unnecessary to conduct research for every project; using available research information, where it is available, is more resource-effective.

5.3.3 Addressing the Challenges

In order to strengthen evidence-based planning in the Cambodian water resources and agriculture sectors, respondents (especially those from DPs and academic institutions)

proposed a number of measures. The majority suggested that local research institutions need to be strengthened so as to be able to provide more accurate and appropriate information to policy stakeholders. Respondents also pointed to the need for improving research communication skills, the co-production of knowledge in CCA work and the establishment of climate change knowledge intermediaries (Table 5.1).

The low capacity and status of local research organisations was acknowledged by nearly 60 per cent of the respondents. One government official interviewed even predicted that research capacity within the water resources and agriculture sectors will be weakened in the future, because many students prefer management courses. In regards to the low status of research organisations, one MAFF respondent said, “local research institutes and universities can only provide minor assistance to policy development because they lack resources,” while another DP individual noted that, “some research provides inappropriate recommendations.” Therefore, the respondents thought that it was critical that local academic institutions and individual researchers strengthen their research capacity. It was explained that by doing so, research organisations would gain credibility, thus building trust about the services they provide to policy stakeholders.

Table 5.1 Respondents’ suggestions for bridging research–policy development gaps in Cambodia

Suggestions	Percentage of respondents (n=28)
Strengthening the research capacity of local universities	57
Strengthening research communication skills	39
Co-production of CCA knowledge	29
Establishing CCA knowledge intermediary	11

Nearly 40 per cent of the respondents pointed to the need for improving research communication strategies as way to enhance the use of research for policy development. One academic respondent stated, “researchers should have good communication skills and be patient.” The respondent further suggested that research reports should be written in a language that does not sound critical, otherwise policymakers will resist or

ignore it. With balanced, objective and neutral language, research organisations and researchers can build good relationships with government ministries and thus be able to inform policy development with their evidence-based findings. The Cambodian Development Resources Institute was mentioned as having done well in this respect.

There were two main research communication strategies common in practice as indicated by respondents whose organisations implemented research projects (including academic institutions, government and DP organisations). Disseminating research reports to policy stakeholders was mentioned by more than 80 per cent of the respondents, and research–policy dialogue events (e.g. dissemination workshops, seminars, and conferences) was mentioned by more than 60 per cent of them. According to the respondents, dissemination workshops were generally organised when funding was available. Personal contact and engaging policy stakeholders in research projects were mentioned by some respondents from academic institutions.

Disseminating policy briefs instead of full research reports was reported to be a recent practice by some local research organisations like the Cambodian Development Resources Institute. The respondents observed that the approach was effective and suggested it be applied more widely. They emphasised that the policy briefs should be between two to four pages and written in local and simple language that can be easily understood by policy stakeholders. Most government respondents, especially senior officials, indicated a printed document was appropriate for them because they had limited access to the Internet as well as not being accustomed to downloading and reading online.

According to respondents, research–policy dialogue in Cambodia was often ineffective because generally technical officials were sent to attend dialogue events. Getting policymakers’ participation in such dialogues was claimed to be difficult. One academic stated, “a key challenge here is that we [dialogue organisers] were not able to access to high-level policymakers.” The respondents observed that the presence of the Prime Minister in the research–policy dialogue was influential in attracting attention of high-level policymakers (e.g. ministers and the secretaries of state of line ministries).

However the presence of the Prime Minister only happened in large events such as development forums and national climate change forums that were only organised infrequently.

Personal contacts were also used to reach high-level decision-makers. One academic respondent reported having successfully organised a policy round table discussion with relevant policymakers by using their personal contacts. Similarly, two other academic respondents reported using relationships with influencers as a channel to communicate research results to policymakers. One of them recounted: “the research team aimed to convey the research results to MAFF’s Minister, but we could not access him, so I took the result to discuss with my rector who had good relationship with him.” Another respondent reported to having used the secretariat office (recruited by the funding agency) as a channel, saying that “we kept the secretariat office informed about the research: design, analysis and results because they have more access to policymakers.”

Nearly 30 per cent of the respondents, mainly from academic institutions, pointed out that it was effective to communicate research information to policy stakeholders by engaging them in the research process. One respondent argued that “it is important to engage policymakers in the research process; this approach is highly effective in informing policymakers.” Another respondent observed that Ministry of Planning tended to use research information more when they were engaged in the research process. Another respondent reported to having engaged policymakers as project steering committee members in research projects as a way to share research information with them. Engaging policymakers in research process creates shared learning and common interest as well as opportunities to co-produce knowledge.

To strengthen connections between research and practice, about half of the respondents suggested that research projects should engage subnational government, especially the agricultural extension workers who work directly with farmers in vulnerable communities. Some of the respondents also suggested that local academic institutions should assist water resources and agricultural-specialised departments, including the Department of Agricultural Extension, in disseminating research results.

Three DP respondents suggested that knowledge intermediaries be developed to assist with collating relevant information and communicating it to relevant stakeholders. One of them proposed that the CCD works as this bridging body as it has relevant expertise. Funding agencies were mooted as a possible option by two other respondents; however, no specific funding agency was named.

Research respondents also suggested a number of enabling factors that would facilitate more evidence-based planning in Cambodia. For example, a ‘result-based approach’, already piloted by some ministries, including MAFF, was mentioned by 25 per cent of the respondents. One academic respondent argued that, “as the government has introduced a results-based approach, there will be more demand for research because research will direct them towards results.” Two academic respondents noticed increasing interests of funding agencies in promoting evidence-based planning in Cambodia, giving the example of the WB’s support for strengthening the research capacity of local universities. This research capacity-strengthening enables local academic institutions to produce more accurate research information for policy stakeholders, and thus will build their credibility as a knowledge provider to policy stakeholders. In addition to these ongoing efforts, some 70 per cent of respondents suggested ‘mainstreaming climate change into development policies’ in order to facilitate climate-informed development. Furthermore, some 50 per cent of the respondents suggested providing CCA-related capacity-building for relevant stakeholders to enable them to practice climate-informed development planning.

5.4 Discussion

Although there were contrasting viewpoints expressed by respondents, the study found that overall, evidence-based policy development is limited in the Cambodian water resources and agriculture sectors. This is not a surprising finding, however, given that Cambodia is a least developed country with poorly developed local research and science facilities (Kian-Woon et al., 2010; Schwab, 2012). A broader study investigating research–policy linkage in developing countries had similar results (Jones et al., 2009).

There are notions suggesting that Cambodian planning practices will become more evidence-based. This is supported by the introduction of results-based approach within the government's system and the increasing interest of funding agencies in narrowing research and policy gaps by supporting the strengthening of local research capacity will facilitate such changes. The government's commitment to good governance, thus improving transparency and accountability, is also supportive of such a change. Moreover, some stakeholders valued evidence-based planning and seemed to have prepared for it.

Different stakeholder groups pointed to different challenges in connecting research and policy development in Cambodia. The respondents from government organisations pointed to the lack of implementation of development plans as a reason for the gap between research and policy, while those from DPs commented on the lack of relevant information as a key challenge. Respondents from academic institutions generally pointed to issues relating to the communication of research.

The challenge of lack of implementation of development plans has several causes, but is primarily an issue of funding. Due to insufficient funding, governmental plans were only partly implemented. For this reason government respondents did not see the need to have evidence-based planning. This finding suggests that the water resources and agriculture development plans were unrealistic, with a large mismatch between proposed activities, projects and programs and available budgets. Although one may argue that all of the water resources and agriculture development plans and the national development plans overall aim to guide overseas development assistance to Cambodia, this mismatch remains a concern. Firstly, it undermines the value and credibility of government plans and policies and secondly, it weakens the motivation and legitimacy of government officials.

In current planning, government budget covers only about 10 per cent of the total amount required for implementing national development plans (Sato, Shiga, Kobayashi, & Kondoh, 2011), thus it is assumed that the 90 per cent of the budget will be covered

by overseas development assistance. Securing overseas development assistance, however, is a challenge and relevant officials (e.g. department-planners) need to have appropriate knowledge to do it. Therefore, it is important to build the capacity of departmental directors, deputy directors and key officials with planning and fundraising roles so they will be able to secure external funding support to implement their plans. Furthermore, given that only a limited budget is available for implementing policies concerning water resources and agriculture, ministry plans should be scoped down to be realistic and implementable.

The findings that there was a lack of adequate relevant information for planning and weak research capacity of local academic institutions were not surprising. Previous studies (Dany et al., 2014; Kian-Woon et al., 2010; Schwab, 2012) have also indicated these difficult situations for not only issues relating to climate change but also other sectors in Cambodia. These issues need to be addressed in order to promote evidence-based planning in Cambodia. Given the fact that the government does not allocate any budget for research and science, strengthening the research capacity of local academic institutions is a considerable challenge and it may take time in order for them to be able to provide quality services to policy stakeholders unless funding agencies are willing to support some selected public universities (e.g. the RUA) to develop relevant research programs that are necessary for agriculture development, especially taking into consideration climate vulnerabilities. Lebel (2014) argues that developing appropriate and relevant research agendas for CCA is a critical challenge. Therefore, it is suggested that the development of the CCA research agenda in Cambodia should be done in close consultation with respective ministry long-term development policies and national and sectoral climate change strategies.

Another challenge is the need to use available resources for research more effectively. This is a challenge because research projects in Cambodia are implemented by many organisations under different programs and collaborations. One way to reduce duplication would be to revise organisational roles and mandates, for example, allocating research work to local academic institutions rather than government ministries or DPs. Another way is to develop a collaborative research program, as some

respondents suggested, including, for example, the Cambodian Agriculture Research and Development Institute, RUA and the General Directorate of Agriculture.

Only a few respondents suggested knowledge intermediaries for facilitating evidence-based planning in Cambodia; this is an unexpected finding. Building the capacity of local academic institutions requires extensive resources and time, therefore introducing knowledge intermediaries to facilitate research and policy is seen as necessary (at least for the short term). It is necessary because there is a demand for relevant quality information for water resources and agriculture development, especially in the face of climate change; there is limited local information available, in general, and even less that is CCA-specific (e.g. climate change and impacts projections for water resources); local research capacity is limited and has progressed slowly; and the lack of experience in evidence-based planning of Cambodian policymakers requires proactive and constant communication and dialogue. The modest level of support for the notion of knowledge intermediaries may be due to the stakeholders' unfamiliarity with and/or limited understanding of the concept.

In practice, both international and local consultants have played roles as knowledge intermediaries sharing knowledge (Fisher, 2010; Jones et al., 2009; Meyer, 2010) with relevant policy stakeholders. They assisted policy stakeholders in developing policies, plans programs and project documents, as well as implementation in some cases. A prime concern in using consultants is that they are temporary and rely on external funding support. Additionally, to be effective, knowledge intermediaries require appropriate skills and competencies, especially the ability to interpret and apply research findings and build positive relationships and trust with relevant stakeholders (Dobbins et al., 2009). These requirements cannot always be expected from consultants. Therefore, additional types of knowledge intermediaries are needed. Research respondents pointed to the CCD or funding agencies as suitable candidates. Members of climate change technical committee could also be potential candidates as knowledge intermediaries.

The co-production of knowledge through engaging policy stakeholders in research processes has been demonstrated in Cambodia, for example, in an international research partnership implemented by the Australian Commonwealth Scientific and Industrial Research Organisation (Roth, 2010; Roth & Grünbühle, 2012). Additionally, research respondents also mentioned other forms for engaging policymakers in research processes, for example, as members of project steering committees. The participation of policymakers in research projects is expected to increase their understanding of science as well as their understanding of the policy problems experienced by researchers, creating opportunities for learning and co-production (Larsen et al., 2012; Lemos & Morehouse, 2005; Yuen et al., 2013). Such interactions would also enable more evidence-based planning.

Given the important role of department-planners in ministry and national planning processes, engaging these officials in relevant research is essential. In the current planning process, the officials facilitate the development of their department plans, which are the basis for ministry and national development plans. It is also important to appropriately engage members of national and technical climate change committees in relevant research projects to enable them to effectively participate in climate change policy development. The stakeholders should also be provided with some training on evidence-based planning and climate change mainstreaming to improve their planning skills thus enhancing the chance of using research evidence.

Local academics should be engaged in CCA projects, programs and policy development – they are more available than research projects, at least at the present. The technical climate change committee and the TWGs, as key formal institutional platforms, should also include local academics. Academics who are included can share their expertise to assist policy development, taking on the role of knowledge intermediaries, and also use the platforms to access the data and information required for research (Welp et al., 2006). Via the platforms, research and policy stakeholders can jointly identify priority research topics, as well as help interpret, translate and validate research results. Such practices are already common in the fisheries sector under the TWG on fisheries, suggesting it is also plausible for other working groups dealing with CCA issues.

Research respondents suggested organising policy briefings, disseminating summaries for policymakers and organising dissemination conferences as ways to communicate research results to policy stakeholders. One of the key challenges identified by this study is gaining access to policymakers at high levels. It was evident that the presence of the Prime Minister in dialogues was influential in getting the participation and attention of other senior officials. When dealing with sensitive issues, it is important that research reports and policy summaries be written in non-provocative way, otherwise the information is likely to be resisted. Personal contacts to appropriate channels can also help convey research results that are sensitive.

5.6 Conclusion

Although Cambodia's domestic research capacity remains very limited and evidence-based planning is not yet the dominant paradigm, there has been some progress. Various initiatives are underway to facilitate research and the use of research and other evidence for policy development in Cambodia. Some key stakeholders already acknowledge the benefits of improved research-policy development linkages. In regards to communication strategies, for instance, researchers have applied various document and event or dialogue-based approaches. These indicate growing interest in informed multi-stakeholder deliberation as an input to evidence-based planning and policy development.

This study identified several challenges in narrowing research and policy development in the Cambodian water resources and agriculture sectors that need to be addressed. The challenges are classified into three categories: lack of implementation of government plans, lack of relevant information, and social and cultural barriers. Specific responses to the challenges are proposed in Table 5.2. Many of the proposals deal with improving institutional capacity, arrangements and approaches. However, although they are practical and implementable, commitments from relevant stakeholders are required.

Table 5.2 Challenges and recommendations for narrowing research and policy development in the Cambodian water resources and agriculture sectors

Challenges	Recommendations
<p><i>Lack of implementation of government plans:</i></p> <p>Development funding highly dependent on overseas development assistance.</p>	<p>Ministry plans should be scoped down to be realistic and implementable.</p> <p>Department-planners should be provided with some training on proposal writing for fund-seeking.</p>
<p><i>Lack of relevant information:</i></p> <p>Research capacity of local academic institutions is weak.</p> <p>Research networks are driven by available funding opportunities and not responding to local needs.</p>	<p>Selected public universities should be supported (by funding agencies) to develop targeted research programs.</p> <p>New collaborative research programs are needed, for example, among Cambodian Agriculture Research and Development Institute, Royal University of Agriculture and the General Directorate of Agriculture.</p>
<p><i>Social and cultural barriers:</i></p> <p>Policy stakeholders are not accustomed to designing evidence-based policy and planning.</p> <p>Conveners of research dialogues find it difficult to access policymakers at higher levels.</p>	<p>Policy stakeholders, especially department-planners and members of climate change committees should be engaged in the adaptation research process.</p> <p>Policy stakeholders should be provided with training on evidence-based planning.</p> <p>Local academic institutions should be engaged in adaptation projects, programs and policy development. They should also be included in the existing institutions such as technical working groups and climate change committees.</p> <p>Conveners need to make better use of personal contacts and improved communication techniques to attract senior officials to research dialogue events.</p>

Further research on knowledge intermediaries is suggested. It is important to examine appropriate forms of the knowledge intermediaries, for example, who should be involved, what roles or functions they should have, what capacity and skills are required and where the capacity-building can be obtained. Cambodia will benefit from the available information (e.g. from the Intergovernmental Panel on Climate Change and other organisations such as United Nations Development Program and other academic chapters) if appropriate knowledge intermediaries are developed. There is also a need to draw on lessons learnt elsewhere about how to strengthen the linkages between research

and policy development, and experiment with some of these options in the Cambodian context to identify those which are institutionally, socially, culturally and economically acceptable and affordable.

In summary, this chapter surveys stakeholders' perspectives in relation to evidence-based development planning in Cambodia in terms of current practices and the potential for improvement. The key focus of this chapter is exploring effective strategies for communicating research results to policy stakeholders and engaging them in research processes to thus facilitating an uptake of research or other forms of evidence for development planning. Moreover, given the fact that there is a lack of climate change research projects in Cambodia as well as research projects in general, the chapter points to the importance of engaging local academic institutions in existing climate change and development (in general) projects and programs. The engagements can be arranged in the form of official members of the existing institutions such as climate change technical committees and the technical working groups of relevant sectors.

The following final chapter summarises the key findings of the research in relation to the research objectives and goal. It also consolidates the conceptual framework of this study, with some evidence from this research and most recent literature, conceptualising it as a guiding framework for climate-informed planning.

6. Conclusions and Recommendations

This final chapter is comprised of four sections. The first section summarises the key findings from the research in relation to the research objectives and goal. The results also underline the significance and contribution of this research to climate change adaptation policy development in Cambodia, which may also be relevant and useful to some other countries with similar socio-cultural and political contexts. The second section aims to consolidate the study's conceptual framework, framing it as a guiding framework for integrating climate change concerns into development policy and plan. The third section highlights the key contributions of this research to the body of knowledge. The final section suggests some areas for further study.

6.1 Summary of the Key Findings and Policy Applications

The research for this PhD aimed to explore how Cambodia could develop climate-informed planning and policy development for the water resources and agriculture sectors. The research had four main objectives: to examine the challenges and opportunities for practicing climate-informed development planning in Cambodia; to assess the mainstreaming of climate change into Cambodia's national development planning and examine pathways for effective mainstreaming; to evaluate climate-informed development planning using community knowledge; and to analyse mechanisms for narrowing the gaps between research and policy development in Cambodia. The outcomes of the research documented in this thesis provide insights about the institutional practices, experiences and perceptions relating to the research objectives. The research was guided by the conceptual framework presented in Figure 1.5.

Research was conducted in relation to the first research objective by identifying the key challenges in practicing climate-informed planning and the potential for improvement in those challenges, thus facilitating climate-informed development planning. This component of the study has identified a number of governance and institutional-related issues that require improving in order to effectively facilitate climate-informed

development planning in Cambodia. Key governance issues include the ineffectiveness of climate change committees, a lack of fairness relating to climate change adaptation decision-making and policy outcomes (thus the allocation of adaptation resources) and lack of motivation for government personnel to do adaptation work. The inflexibility in the existing climate change institutions and the lack of adequate representation, especially the absence of local academic institutions, need be addressed in order to facilitate climate evidence-based development. Furthermore, Cambodia also faces serious challenges due to the lack of local climate change adaptation experts and information, and requires intensive capacity development and stronger commitment for information-generating and sharing.

Understanding these challenges and possibilities, the study then assessed ongoing efforts for mainstreaming climate change into Cambodia's national development strategic planning and examined pathways for effective mainstreaming, responding to the second objective of the study. It was found that from the perspective of state actors, the national planning process is relatively participatory and flexible, in that it provides opportunities for the inclusion of climate change considerations. As a result, climate change is now more articulated in Cambodia's current national strategic development plans than it was in the 2009–2013 planning period. This is a good initial step, however, there are some critical disconnects; for example, members of the National Climate Change Committee are not engaged in the formation of the National Strategic Development Plans. Communicating and deliberating relevant knowledge with stakeholders so they can routinely design and implement climate-informed development planning are of critical importance. This component of the study identified a number of pathways for mainstreaming climate change into Cambodia's strategic development planning, especially those for the water resources and agriculture sectors. There were various entry points in the planning system for mainstreaming climate change, however, the departmental development plans should be the main entry point with department-level planners are the key actor.

Given the fact that Cambodia's institutional capacity, including scientific capacity, is weak, the study also evaluated climate-informed development planning using

community knowledge, thus responding to the third objective of this research. It aimed to explore how local development planning can be informed by climate evidence collected from community knowledge to thus minimise the risk of climate change on local development. Thus, the research for this has identified pathways for integrating climate change concerns into local development decision-making and planning processes. The three-year planning system was indicated as an appropriate system for integrating climate change concerns into subnational development planning with commune development plans as the entry point. The study also demonstrated some models for integrating climate evidence into local decision-making and planning processes that were implemented by the case study projects that are simple and doable for a least developed country like Cambodia. Last, the study provided suggestions on how to improve vulnerability reduction assessment tools and procedures for generating community knowledge on climate change, thus increasing its accuracy. With more accurate information, it is possible to ensure that policy implications and applications are realistic and address local challenges.

The research for this thesis has responded to its final objective by investigating the institutional applications/mechanisms for narrowing the gaps between the research community and policy stakeholders. This component of the study identified a number of challenges and barriers for narrowing research–policy development gaps, including the lack of implementation of development plans; a lack of relevant information required to promote and support evidence-based planning and policy development; and a variety of communication barriers. Evidence-based planning is valued by government officials most when there is actual and effective implementation of policies and plans. In practice, this often implies that governmental policies and plans need be scoped and scaled down to meet the available budget and thus be achievable. In the long term, it also means building the capacity for policy-relevant research on climate change adaptation within Cambodia. Engaging policy stakeholders in the research process for the co-production of adaptation knowledge and introducing knowledge intermediaries was suggested by respondents as a way to narrow the gaps between research and policy development. The presence of Cambodia’s Prime Minister in the research-policy dialogue on adaptation to

climate change is recommended as important for attracting the attention of high-level policymakers.

In conclusion, although in least developed countries like Cambodia where institutional capacity, including science capacity, is very weak, climate-informed development planning still can be undertaken, at least to address present climate vulnerabilities. As relevant organisations and communities work to tackle present vulnerabilities, they build their capacity, thus preparing themselves to respond better to anticipated climate risks. As Preston et al. (2013) indicate, most adaptation responses are learned from past experiences. Also, as stakeholders including local communities gain understanding of climate change issues, it is likely that they will make climate-informed decisions which can provide substantial benefits to them (Füssel, 2007).

To facilitate effective social learning and the co-production of knowledge in adaptation work, it is important that the climate change institutions engage key actors, including policymakers, planners, practitioners and researchers. In the case of Cambodia, local academic institutions have been overlooked not only in the area of climate change but also in all areas of development, as revealed through the processes of national and subnational strategic development planning discussed in this thesis. This is because there appears to be a consensus assumption among national level non-academic respondents that local academic institutions are weak and thus unable to provide a good information service to policy stakeholders. However, in practice, in cooperation with international partners, some local universities have delivered a number of such services to policy stakeholders, especially in the fields of capacity-building, for example from the Department of Environment of the Royal University of Phnom Penh. Also, there have been numerous climate and development services that are provided by other individuals from local academic institutions to policy stakeholders. The assumption about the inability of Cambodian academic institutions to assist in development planning may be partially true, especially as a lack of funding means that local universities do not have the budget for providing such services, but it is less valid in terms of manpower. The key concern here is motivation, given the lack of incentive systems in Cambodia overall.

Although some local scientific and research capacity exists in Cambodia, it is not sufficient, especially in addressing climate change issues where decisions are made with high uncertainty. Therefore, Cambodia still has a strong need to strengthen the roles and capacity of local academic institutions to enable them to provide more quality information services to policy stakeholders. The acknowledgement and demands from policy stakeholders can be a key driver to strengthen the capacity and roles of local academic institutions. Cambodia should take advantage of the available overseas development assistance, including climate change-related resources and expert services, to build on its own scientific capacity. In practice, this implies that it is important to gradually reduce the dependency on international experts in policy development, shifting their support to assisting in building the capacity of local academic institutions. As a short-term strategy, alternative sources of information could be useful for Cambodia to facilitate climate-informed planning. Scientific information, which although not Cambodia-specific is still relevant, is available from many sources such as the Intergovernmental Panel on Climate Change reports, the United Nations Framework Convention on Climate Change, the Mekong River Commission and relevant academic publications. Additionally, while the location-specific information generated from community knowledge is not scientific knowledge, this information is still useful for local climate-resilient development decision-making.

From the perspective of resources constraints, integration of climate change concerns into either national or subnational development decision-making and planning processes in Cambodia could be done effectively if appropriate pathways are identified. At the national level, the integration of climate change should ideally be done via the development of department-level plans, the foundation of the ministry and eventually the National Strategic Development Plan. In so doing, it is crucial to build the climate change-relevant knowledge of department-planners and key persons in the relevant departments of planning of line ministries as well as the General Directorate of Planning which coordinates the National Strategic Development Planning (as discussed in Chapter 3). The integration of climate change concerns into subnational planning can be done through the three-year implementation plan system, with commune development

plans as the target. There is a need for strong support both in funding and expertise from national level organisations, line ministries and then respective provincial departments and DPs in order to assist local governments in taking climate change concerns into account with their decision-making and planning for local development (as discussed in Chapter 4).

6.2 Consolidation of the Study's Conceptual Framework

With empirical evidence from this research and recent literature, the study's conceptual framework was consolidated and conceptualised as a guiding framework for integrating climate change concerns into development policy and planning. The framework is illustrated in Figure 6.1. As acknowledged in the study's conceptual framework (Figure 1.5), five key components are considered important to effectively facilitate the integration of climate change concerns into development policy and planning. They are key actors and institutional arrangements, institutions and governance processes, stakeholder's engagement and research communication strategies, enabling factors, and the need to identify entry points for integrating climate change concerns into development policy and planning. The consolidated version of the framework also acknowledges the importance of the components; however, it provides more details in terms of subcomponents and their relationships.

As shown in Figure 6.1, key actors play an important role in this framework and an institutional arrangement sets a frame in terms of the individuals or organisations that should or will participate, therefore it is considered as one of the key components for mainstreaming climate change (Pervin et al., 2013). The role of researchers and scientists in planning for climate change is underlined in various studies (e.g. Fussler, 2007; Lemos & Morehouse, 2005; Veraart & Bakker, 2009). In some circumstances, knowledge intermediaries are necessary (see Chapter 5 for further explanation). The availability of the key actors likely determines the chosen mechanisms for connecting research and policy. For instance, in Cambodia, the established climate change institutions did not include either researchers or knowledge brokers, therefore the co-production of adaptation knowledge and knowledge intermediaries were almost not applied.

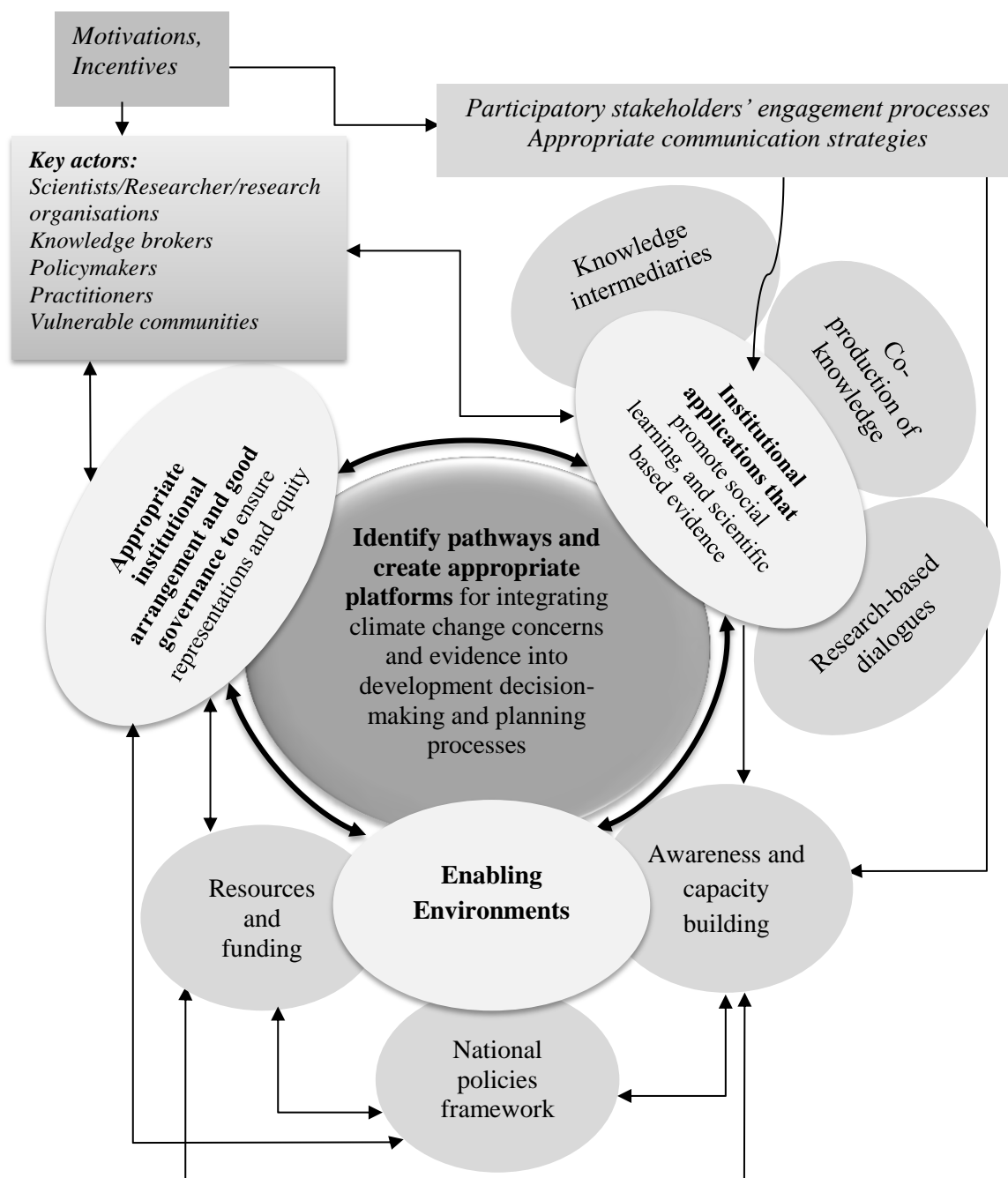


Figure 6.1 Proposed guiding framework for integrating climate change concerns into development policy and plan

Source: Author, 2015

The actors' willingness to participate is motivated by good governance (e.g. transparency, equity and legitimacy in relevant decision-making processes) employed

by the established institutions, and incentives. The issues of motivation and incentive are discussed in a number of studies (e.g. Jutting, 2003; Lebel, 2014). Jutting (2003) argues that incentives, disincentives, and the distribution of power influences the behaviour of actors, therefore it determines the outcome of institutional arrangements. Similarly, Willems and Baumert (2003) found that without incentives, quality officials in least developed countries moved to better paid jobs, thus resulting in the ineffective implementation of climate change projects or programs. This issue was also evidenced in this research (see Chapter 2).

The selection of appropriate institutional applications or mechanisms for connecting research and policy depends on the decisions of the key actors and therefore representation, equity and legitimacy are essential. The importance of institutions and governance processes for planning for climate change are acknowledged in the literature (cf. Adger et al., 2005; Lebel, 2014; Nelson et al., 2007). This is because planning for climate change requires participatory approaches (Butler et al., 2014; Daniell et al., 2011; Wise et al., 2014) as they can support social learning and lead to the co-production of knowledge (Armitage et al., 2011; Preston et al., 2013). Adger et al. (2005) agree, arguing that successful adaptation should support social learning.

At a technical level, effective stakeholder engagement processes (Bowen et al., 2013; Yuen et al., 2013) and appropriate communication strategies (Finch, 1986; Miller et al., 2010) are crucial in promoting collaboration and social learning among stakeholders. Therefore, whatever institutional applications (e.g. co-production of knowledge or research–policy dialogue) are applied, it is important that stakeholders are actively engaged in the processes. Additionally, appropriate research communication strategies are needed in order to effectively convey scientific information to policy stakeholders. The strategies used may vary from one country to another. Geoffrey (2007) argues that a two-way communication process between scientific bodies and policy stakeholders is effective in communicating research information into policy. The presence of the Prime Minister in the research–policy dialogue was observed to be influential in Cambodia.

Moreover, the institutional arrangements, the institutions and governance processes and the selection of the institutional applications relate to enabling factors, especially available resources, institutional capacity and enabling policy frameworks. These elements also relate to one another (see Figure 6.1). For instance, vulnerability assessments facilitate the co-production of knowledge, which may be effective in narrowing gaps between research and policy development, however, it requires more resources than stakeholders' research dialogue. Undertaking vulnerability assessment also requires more scientific capacity (Fussel & Klein, 2006; Lemos & Morehouse, 2005; Yuen et al., 2013). Likewise, Lemos and Morehouse (2005) point to the important role of funding agencies, academic institutions and policymakers in undertaking such assessments in order to produce meaningful strategies to respond to climate vulnerabilities. Lebel (2014) agrees with these arguments, concluding that in order to achieve successful adaptation, stakeholders should have appropriate capacities, knowledge, resources and incentives. Relevant empirical evidence on the enabling environments is revealed in Chapters 2 to 5.

Finally, this research suggests that it is important to identify pathways for integrating climate change concerns into development policy and planning in a least developed country like Cambodia where formal institutions are not sufficient and stakeholders are not accustomed to the evidence-based planning. The pathways refer collectively to entry points and influential decision-makers within the planning systems, as well as relevant institutions that can influence the integration of climate change concerns into development policy and planning effectively. Some systems already exist, while others may need to be established. In the case of Cambodia, at a national level, the technical working groups had some influences on the formulation of national development policy and planning, while the climate change committees played crucial role in mainstreaming climate change in Cambodia. At a subnational level, although there was a comprehensive planning system in place, it was not equipped with the appropriate mechanisms and capacity to effectively facilitate the integration of climate change concerns or climate evidence into the decision-making and planning processes. Therefore, additional platforms, for example a project selection workshop in the LGCC project, was established.

6.3 Contributions to the Body of Knowledge

The research for this thesis has contributed to the body of knowledge in a number of ways. The first and foremost way is with the development of a proposed guiding framework for climate-informed planning (shown in Figure 6.1). It is acknowledged, as Ayers et al. (2014) indicate, there is no single best way for mainstreaming climate change. Although there are already a number of mainstreaming frameworks, the framework developed for this research presents a more holistic approach for use in a least developed country such as Cambodia, consisting of the key components addressed in the literature and evidence from this Cambodian study. In addition to recommendations regarding the important components that are required for planning for climate change (see Figure 6.1), this research makes recommendations regarding processes involved in each of the components. As indicated in previous research (e.g. Butler et al., 2014; Huq & Ayers, 2008), empirical work on how the harmonisation between adaptation and development can be realised remains limited. Therefore, this study responds to that knowledge gap in relation to Cambodia. This framework can also guide similar studies, thus contributing to the development of research methodology in this area.

At a more detailed level, the research for this thesis has highlighted some models used in Cambodia for integrating climate change concerns or climate evidence into the development decision-making and planning process, both at national and subnational levels, which could be useful for other countries as well. Two examples of this are the assistance that the vulnerability reduction assessments' facilitators of the NAPA-FU project provided to commune governments in order for them to integrate climate-resilient projects into their commune investment plans and the project selection workshop of the LGCC project as another model for integrating climate concerns into decision-making process. These processes are far simpler than what has been discussed in the previous literature (e.g. Veraart & Bakker, 2009) and are practical for least developed countries like Cambodia, where local development plans are small and short-term.

The study also presented an alternative source of climate evidence that is generated by community knowledge to facilitate climate resilient development, including the tools to generate such information. This is an area that has not yet been well researched. Confirming findings in the literature (e.g. Adger et al., 2007; Lebel, 2014), this study has also indicated that given the large development deficits that Cambodia is confronted with, climate change mainstreaming is likely to be only considered when adaptation resources are available. Also, in order to enable least developed countries such as Cambodia to mainstream climate change concerns, there is a strong need to build their capacity, both climate-specific and climate-relevant (as discussed in Chapters 2 and 3)

6.4 Further Research

Further research relating to planning for adaptation to climate change in Cambodia has been suggested in previous chapters. However, there are still many gaps that need to be addressed in the case of Cambodia. Stakeholders' motivations, especially among government organisations including local universities, need to be explored to find out what motivations will lead to more productive outcomes. Given the typical situation in Cambodia where government salaries are low while living costs are fairly high, an understanding of stakeholder motivation is critically important. The study should cover stakeholders from all areas of development, including public universities. Another fruitful area for research would be an examination of the needs regarding the alignment between national and subnational development policies and planning. In relation to climate change adaptation, it is important to examine the implications of national-level climate change policies development on communities building resilience to climate change. It could also be of interest to explore ways for increasing the effectiveness of international expert services to Cambodia in strengthening local institutional capacity on both climate change-specific and climate-relevant capacity. Lastly, the guiding framework for integrating climate change concerns into development policy and planning proposed by this study needs to be tested and modified if necessary.

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Appendix A: Ethical Approval and Informed Consent Form



HUMAN RESEARCH
ETHICS COMMITTEE
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12 April 2012

Associate Professor Bhishna Bajracharya
Professor Michael Regan, Ms Va Dany
Institute of Sustainable Development and Architecture
Bond University

Dear Bhishna, Michael and Dany

Project No: RO1430
Project Title: Climate Change Adaptation Planning in Cambodia and Potential for Improvements

I am pleased to confirm that your Project, having been reviewed under the Full Review Procedure, has been granted approval to proceed.

It is important to remember that BUHREC's role is to monitor research projects until completion. The Committee requires, as a condition of approval, that all investigations be carried out in accordance with the National Health and Medical Research Council's (NHMRC) National Statement on Ethical Conduct in Research Involving Humans and Supplementary Notes. Specifically, approval is dependent upon your compliance, as the researcher, with the requirements set out in the National Statement.

Additionally, approval is given subject to the protocol of the study being under taken as declared in your application, with amendments, where appropriate.

As you may be aware the Ethics Committee is required to annually report on the progress of research it has approved. We would greatly appreciate notification of the completed data collection process and the study completion date.

Should you have any queries or experience any problems, please liaise directly with Caroline Carstens early in your research project: Telephone: (07) 559 54194, Facsimile: (07) 559 51120, Email: buhrec@bond.edu.au.

We wish you well with your research project.

Yours sincerely

Dr Mark Bahr
Chair



Climate Change Adaptation Planning in Cambodia and Potential for Improvement

Ethics Reference Number: RO-1430

Participant Informed Consent

I understand that participation in this study is **completely voluntary** and I may withdraw at any time without risking any negative consequences. If I choose to withdraw my participation in this study, the information I have provided will be immediately destroyed. All the data collected in this study will be treated with complete **confidentiality** and not made accessible to any person other than the researchers working on this project. The information provided will be dealt with in a manner that ensures **anonymous**. Data will be stored in a secured location at Bond University for a period of five years in accordance with the guidelines set out by the Bond University Human Research Ethics Committee.

I agree to take part in the above Bond University research project. I have read the Explanatory Statement. I am willing to be interviewed by the researcher which will take about 60 minutes and I understand that I may receive a follow up correspondence from the researchers.

Signed:

Date:

Appendix B: Interview Guide for Institutional Ethnography

Date of interview:

Respondent ID..... Your position and organisation:.....

I. Respondents and their organisations' responsibilities and mandates

1. What are your responsibilities in your organisation?
2. How long have you been in charge of these tasks?
3. What are mandates /mission of your organisation?
4. What are key activities of your organisation?

II. Ongoing research, research networks/bodies, and communication strategies

5. What areas of research does your organisation focus on?
6. Does your organisation conduct any climate related studies?
 - a. What research topics have been undertaken?
 - b. What tools/methods does your organisation use in generating the information?
 - c. Is there any tools/methods that you have used personally?
7. Has your organisation conducted any climate and agriculture related studies?
 - a. What research topics have been undertaken?
 - b. What tools/methods does your institution use in generating the information?
 - c. Are there any other tools/methods that you have used personally?
8. Has your organisation conducted any climate and water related studies?
 - a. What research topics have been undertaken?
 - b. What tools/methods does your organisation/center use in generating the information?
 - c. Are there any other tools/methods that you have used personally?
9. Who/what organisations are your information users?
10. How do you communicate research findings/results to users?
 - a. Policy-makers and planners:
 - b. Practitioners:

11. What are main challenges you (your organisation) have encountered in communicating research results?
 - a. Policy-makers and planners:
 - b. Practitioners:
12. What would you comment in term of effectiveness of the communication strategies you and your organisation have used to communicate research results to:
 - a. Planners and policymakers
 - b. Practitioners
13. What strategies do you think would be the most effective way to communicate research results to:
 - a. Planners and policymakers
 - b. Practitioners
14. What would you comment in term of effectiveness of the communication strategies you and your organisation have used to communicate research results to:
 - a. Planners and policy-makers
 - b. Practitioners
15. What strategies do you think would be the most effective way to communicate research results to:
 - a. Planners and policy-maker
 - b. Practitioners

III. Decision-making and planning processes

16. Please describe the step-by-step planning process that has been practised in your organisation (Office, Department, Directorate, Ministry)?
17. Who are involved in the planning process? Who usually facilitate the process?
18. Who are the most influential persons in the process? Please elaborate.
19. Is there any information that basically used for the planning? Y/N
20. What information, especially the climate-related information that has been used?
21. At which stages is that information taken into account?
22. Was the information adequate in terms of quality and quantity? Please elaborate.

23. What constraints and challenges has your organisation encountered with current planning practices?
24. How have they been addressed? Any lessons learned?

IV. Stakeholders' understanding and perception about adaptation and climate-informed planning

25. Based on your opinion, would current planning activities be sufficient in the face of climate change? Please elaborate?
26. What adjustments to your or (water and agriculture related) organisation current activities or strategies do you think are perhaps necessary in order to cope with future climate risks? What are the reasons for the adjustments? Where did you get the ideas from?
27. What challenges would you anticipate if your or (water and agriculture related) organisation adopted a more climate-informed adaptation planning process?
28. How would these challenges be addressed?
29. Overall, how significant is it that your or (water and agriculture related) organisations should consider undertaking a more climate evidence-based planning? Please rank as: very important, important and less important.
30. How do you define climate change adaptation? Please provide an example of a few adaptation options.

V. Access and relevant information for climate-informed planning

31. What additional information do you think that may facilitate a more climate evidence-based planning within water and agriculture sectors?
32. What sources will you or your or (water and agriculture related) organisation have access to the information?
33. What difficulties and challenges may your or (water and agriculture related) organisations have in order to access and apply relevant information and knowledge into existing planning process?
34. In what ways (internet/email, hard copy reports/publication, workshops...etc) do you think that your or (water and agriculture related) organisation can best

receive (with existing capacities) climate related information needed for adaptation planning?

35. What mechanism would you propose in order to assist your or (water and agriculture related) organisation to better access and benefit from available information?

VI. Institutions and governance for climate-informed planning

36. How can the interface between research/science and CCA policy-making and planning within water and agriculture sectors in Cambodia be narrowed?
37. How can the interface between research/science and CCA implementation (practitioners) within water and agriculture sectors in Cambodia be narrowed?
38. In what ways would local research institutes and networks assist your or (water and agriculture related) organisation towards implementing climate-informed decision-making and planning?
39. Overall, what kind of institutional arrangement (horizontal and vertical) or coordination mechanism do you think may be able to facilitate the planning and implementation of climate-informed planning?

Appendix C: Interview Guide for Case Study

Date of interview:

Project:.....

Respondent ID.....

Your position or involvement in project:

I. Background of the project

1. Sectors focused
2. Project geographical areas and scale
3. Duration:
4. Budget (US\$) and funders:
5. Key activities and progress to date:
6. How the project was designed? By whom and who else involved in the process?
7. Please describe the project implementation arrangement including the implementation agencies?

II. Capacity building

8. What capacity building activities were, are or will be conducted in this project?
9. Do you think that the capacity buildings addresses capacity gaps of stakeholders' institution? Please elaborate.
10. Any thoughts for future improvement or next steps?

III. Generation of climate-related information for local planning

11. Methods, tools and approach used to generate the information?
12. In what way the findings were used?
13. What were the challenges and lessons learned?

IV. Local planning processes and an integration of climate change concerns

14. What development plans does your organisation have/developed?
15. Please describe your local planning processes?
16. Challenges and lessons learned?
17. Please explain your approaches in Mainstreaming climate change concerns or climate change resilience or adaptation into local development plans?

18. What drivers do you think that contribute to the success of this mainstreaming attempt?
19. What barriers or challenges that the exercise has encountered or expected to happen?
20. What lessons or/and suggestions would you like to make for effective CC mainstreaming?

V. Implementation of adaptation measures

21. What adaptation measures were selected and implemented in this project?
22. What makes the project as climate change adaptation (any differences from development as usual)?
23. Who or what organisations are key stakeholders in the implementation of the adaptation measures?
24. Please describe decision-making process in selection of the adaptation measures (stakeholders involved, information used)
25. Please describe stakeholders' (farmers, policymakers) engagement processes in implementing the selected measures?
26. What would you comment regarding cooperation of different stakeholders in the project? How could it be strengthened?
27. What barriers or challenges that the project has encountered or expected to happen?
28. What drivers do you think that contribute to the success of adaptation?
29. Could you describe the impacts or potential impacts of the adaptation measures on local communities?
30. Do you think the project is effective in dealing with climate change? Please elaborate.
31. What would you suggest to future climate change adaptation projects (focuses, activities, institutions/implementation arrangement, stakeholders engagement processes, mainstreaming processes, capacity building focuses...etc)?
32. What lessons or/and suggestions would you like to make for more effective implementation of climate change adaptation measures.

Appendix D: Institutional Ethnography Research's Respondents' Profiles

Respondent ID	Respondents' responsibilities/ roles	Respondents' organisation
1	Management, planning, implementation	MAFF
2	Management, planning, implementation	MAFF
3	Management, planning, implementation	MAFF
4	Management, planning, implementation	MAFF
5	Management, planning, implementation	MAFF
6	Management, planning, implementation	MAFF
7	Management, planning, implementation	MAFF
8	Management, planning, implementation	MAFF
9	Management, planning, implementation	MAFF
10	Management, planning, implementation	MAFF
11	Management, planning, implementation	MAFF
12	Management, planning, implementation	MAFF
13	Management and coordination	MOE
14	Management and research	MOE
15	Management and coordination	MOP ⁶
16	Management, planning, implementation	MOWRAM
17	Management, planning, implementation	MOWRAM
18	Management, planning, implementation	MOWRAM
19	Management, planning, implementation	MOWRAM
20	Management, planning, implementation	MOWRAM
21	Management, planning, implementation	MOWRAM
22	Management/administration	MOWRAM
23	Project official and CC specialist	ADB (2 respondents)
24	Project official	ADB

⁶ Ministry of Planning

25	Local consultant/engineer	ADB
26	Senior program manager	AusAID ⁷
27	Management, planning, implementation	CEDAC ⁸
28	Management	FAO ⁹
29	Technical advisor	IFAD
30	Team leader	UNDP
31	Environment specialist	WB
32	Research	CDRI ¹⁰
33	Research and management	CDRI
34	Research and management	CARDI ¹¹
35	Research and management	IFRI ¹²
36	Research and management	MFR&DI ¹³
37	Teaching and research	ITC ¹⁴
38	Management, teaching and research	RUA
39	Management, teaching and research	RUA
40	Management, teaching and research	RUPP ¹⁵
41	Management, teaching and research	RUPP (3 respondents)

⁷ Australian Agency for International Development

⁸ Centre for Study and Development in Agriculture

⁹ Food and Agriculture Organisation

¹⁰ The Cambodian Development Resources Institute

¹¹ Cambodian Agriculture Research and Development Institute

¹² Inland Fisheries Research Institute

¹³ Marine Fisheries Developments and Research Institute

¹⁴ Institute of Technology Cambodia

¹⁵ Royal University of Phnom Penh